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ENVIRONMENTAL ASSESSMENT
ELK 36 TIMBER SALE

MONTANA DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION

CLEARWATER UNIT

SOUTHWESTERN LAND OFFICE

FEBRUARY 2002

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CHAPTER I

PURPOSE AND NEED

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CHAPTER I
PURPOSE AND NEED

INTRODUCTION

Chapter I provides the framework for the Environmental Analysis. Included is a discussion of the proposed action, project objectives, and a summary of the organizational and legal basis used to make decisions related to the proposed action. A list of the decisions to be made, and a description of the public involvement process and it's outcome is also included.

A. PURPOSE

This Environmental Assessment was prepared in order to evaluate the potential impacts of a timber sale project proposed by the Montana Department of Natural Resources and Conservation (DNRC). The Forest Management Bureau provides program oversight. The Southwestern Land Office (SWLO) has included this proposed project into their normal work plan and has assigned it to the Clearwater Unit. Craig V. Nelson is the forester responsible for sale preparation. Steven Wallace, Clearwater Unit Manager, is the decision maker responsible for review and approval of the project.

The DNRC proposes the harvest of timber from School Trust land in section 36 T13N R14W, **(See Figure I-1, Vicinity Map).** Hereafter referred to as section 36.

The proposed action would harvest a total of one half to one and one half million-board feet (MMBF) from approximately 300 acres within the project area. **Table II-1** shows the approximate acres to be harvested under the Action Alternative. Under the proposed Action Alternative, the harvest treatments would consist of emulations of fire events of varying intensities. The goal of these treatments would be:

1. Removing diseased, deformed and dying trees.
2. Reducing areas of overstocked trees that have resulted from fire suppression.
3. Creating a tree species distribution and stand structure, which more closely resembles that which existed prior to organized fire suppression.

B. PROJECT NEED

If the Action Alternative were selected, timber harvesting and road building would take place between June 2002 and September 2006.

The lands involved in the proposed project are held by the State of Montana for the support of specific beneficiary institutions such as public schools, state colleges and universities, and other specific state institutions such as the School for the Deaf and Blind (*Enabling Act of February 22, 1892; 1972 Montana Constitution, Article X, Section 11)*. The Board of Land Commissioners and the DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for the beneficiary institutions (*Section 77-1-202, MCA*). On May 30, 1996, the Department released the Record of Decision on the State Forest Land Management Plan (hereafter referred to as the SFLMP, or the Plan). The Land Board approved the SFLMP's implementation on June 17, 1996. The SFLMP outlines the management philosophy of the DNRC for the management of state-owned forested trust lands. The SFLMP also sets specific Resource Management Standards for ten resource categories. The SFLMP states:

> *Our premise is that the best way to produce long-term income for the Trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream. In the foreseeable future, timber management will continue to be our primary tool for achieving biodiversity objectives.*

The DNRC believes that, for the foreseeable future, management for timber is the best way to produce long-term income from these lands. The proposed action is viewed by the DNRC as only one element in the ongoing management of the timber resource within the project area. Future timber harvest entries or the reintroduction of prescribed fire would serve to perpetuate or augment the results of this project.

For the foreseeable future, it does not appear that the amount of revenue generated by the existing mining leases within the proposed sale area will increase significantly. Additionally, forest management activities are not perceived to exclude or impair potential mineral developments. Therefore, they would be unable to generate the income to the trust that would be possible with this project.

C. OBJECTIVES

In order to meet the goals of the management philosophy adopted through the programmatic review in the SFLMP, DNRC has set the following specific project objectives:

1. Generate a reasonable and legitimate amount of income for the School Trust by harvesting between .5 and 1.5 MMBF of timber.

2. Use forest management techniques to restore vigor and move towards desired future or appropriate conditions within treated timber stands in the proposed project area.

3. Capture the value of dying and lower vigor trees for the School Trust before further decline.

4. Provide an infrastructure of roads for future management.

D. CONNECTED AND CUMULATIVE ACTIONS

Connected actions include post- harvest slash hazard reduction, tree planting, grass seeding, ground-based applications of herbicides, right-of-way acquisition, and rehabilitation of landings, skid trails, and temporary roads. Cumulative past, present, and related future state actions within the project area include-wildfire suppression, timber harvesting on federal, state and private lands, reforestation, pre-commercial thinning, road maintenance, mining, and recreational use.

E. RELATIONSHIP TO THE SFLMP

In June of 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan. The Plan established the agency's philosophy for the management of forested state trust lands. The management direction provided in the Plan comprises the framework within which specific project planning and activities take place.

The Plan also defines the Resource Management Standards which guided the planning of this proposed action, the harvest of timber within the Elk 36 project area. The Plan philosophy and appropriate Resource Management Standards have been incorporated into the design of the proposed action.

F. ENVIRONMENTAL ANALYSES (EAs) AND ENVIRONMENTAL IMPACT STATEMENTS (EISs) THAT INFLUENCE THE PROJECT PROPOSAL

In 1996 the DNRC agreed to analyze the Elk Creek drainage with the Bureau of Land Management (BLM) and Lubrecht Experimental Forest (LEF). This analysis compares past and present conditions of composition, structure and patterns of upland vegetation, analyzes the current and projected risk of disturbance for the forested habitats, and identifies resource conditions which are less than satisfactory. The analysis evaluated changes between current and historic conditions in water quality and discharge, stream channel conditions, and aquatic habitats. This analysis went on to propose recommendations for potential Desired Future Conditions (DFC's). The BLM has released the Elk Creek Vegetation and Stream Channel Treatment Environmental Analysis, the Finding of No Significant Impact, and Record of Decision for a proposed project in the Elk Creek Drainage. The associated timber sale sold in early July of 2001.

This EA will only look at the proposed DNRC project and will only make assumptions for reasonably foreseeable actions for the BLM and LEF.

The Environmental Analyses, for the DNRC's Quiet Stems Timber Sale, released in November 1997, (Sections 32 and 34 T16N R15W and Section 36, T16N R16W) and the Clearwater River Timber Sale, released in released in May 1999 (Sections 18, 19, 20, 29, 30, 31, and 32, T15N R14W, and Section 36 T15N R15W), and the Draft Environmental Impact Statement, released in December 1998, and the Final Environmental Impact Statement, released in March 1999, for the DNRC's Sour Fish Timber Sale (Sections 16, 20, 28, 32, and 34 T16N R14W), were referenced to in the development of the proposed Elk 36 Timber Sale for the following reason:

1. The Quiet Stems Timber Sale EA, the Clearwater River EA and the Sour Fish Timber Sale DEIS were also used in developing the Action Alternative for the Elk 36 Timber Sale. The Action Alternatives of each sale were compared in order to maintain a consistent on-the-ground application of the management principles contained in the SFLMP.

G. STATE, LOCAL OR FEDERAL AGENCIES WITH OVERLAPPING OR ADDITIONAL JURISDICTION

1. The Montana DFWP would issue the required 124 Stream Preservation Act permits.
2. The Elk Creek Road is a Missoula County Road, therefore, any work done to this road under the DNRC's aegis must be approved by the Missoula County Road Department.
3. The Keno - Kennedy Road and the Garnet Range Road are Bureau of Land Management (BLM) roads therefore, any work done to these roads under the DNRC's aegis must be approved by the BLM.

H. PERMITS REQUIRED TO IMPLEMENT THE ELK 36 TIMBER SALE

1. A 124 Permit would be required to replace any culverts on perennial stream crossings that are in unsatisfactory condition or improperly located within the project area and to install culverts on newly constructed roads.
2. A right-of-way agreement or easement exchange with the BLM would be needed.

3. DNRC is a member of the Montana Airshed Group, which regulates slash burning. DNRC receives an Air Quality Permit through participation in the Airshed Group.

I. DECISIONS TO BE MADE

The important decisions to be made for the Elk 36 Timber Sale are:

1. Do the Alternatives meet the project objectives?
2. Which Alternative should be selected at this time?
3. Based on the analysis, and decision maker's evaluation, is there a potential for significant environmental effects, and are the mitigations of the Action Alternative acceptable? Has adequate analysis taken place?
4. Should the recommendation be to implement the project, or, should an Environmental Impact Statement be prepared?

J. SCOPING PROCESS AND ISSUE DEVELOPMENT

Public involvement in the planning of the proposed project was first solicited in April of 1995 as part of the proposed Haywire Elk Timber Sale. The project was postponed for one year due to changes in DNRC personnel. Again in April of 1996, public involvement was solicited. The project was again postponed to enable the DNRC to work with the BLM and Lubrecht Experimental Forest to develop a basin wide analysis of Elk Creek. As part of that analysis, vegetation in Section 36 was determined to be highly deviated from pre-settlement conditions, and therefore, a priority area for treatment. A large area of BLM ownership was also determined to be greatly departed from historical conditions. In December 1998, an informative meeting was held at Lubrecht Experimental Forest to bring all of the local landowners and lessees within the Elk Creek drainage. In January 1999, the DNRC and the BLM requested public input for a joint proposal. Copies of the Initial Proposal (**See Appendix B-Initial Proposal**) were mailed to individuals and organizations that had expressed an interest in timber sales that were to be conducted in the Greenough, Montana area and/or State and BLM timber sales in general. An open house was held at the BLM office in Missoula on January 25, 1999. Also, News Releases concerning the Proposed Action were published in the Missoulian (Missoula, Mt.), The Silver State Post (Deer Lodge, Mt.), and The Phillipsburg Mail (Phillipsburg, Mt.) newspapers (**See Appendix B-Public Notice**).

Respondents to the Initial Scoping process were:

Allan Watson	Greenough, MT
The Alliance for the Wild Rockies	Missoula, MT
American Wildlands	Bozeman, MT
Ralph Smilde	Greenough, MT
Mt. Dept. Of Environmental Quality	Helena, MT
Ernie Holt	Bonner, MT
Eric Holt	Potomac, MT
Tim and Sue Buffington	Bonner, MT

K. ISSUES

Through the public involvement and interdisciplinary team processes, several potential issues were raised. Issues related to the proposed Elk 36 Timber Sale have been divided into three types:

1. Issues that were considered and drove the development of the proposed action alternative.

2. Issues that were considered but did not drive the development of the proposed action alternative.

3. Issues that were considered and dismissed as being outside the scope of the project.

Assignment to each type was made based upon an assessment of issue complexity and the effectiveness of the proposed mitigations to eliminate or reduce adverse impacts. Issues that were highly controversial or represented unresolved conflicts were used to design the proposed action alternative.

The issues identified that drove the development of the Action Alternative are as follows-

WILDLIFE:

Overstory cover and movement corridors: There is the concern that harvest can decrease habitat security by removing overstory cover and impacting travel corridors. Thus, harvest can render habitats less suitable or unusable for species such as big game, lynx, fisher, and marten. This is particularly important where overstory canopy cover has been altered in the surrounding landscape. Concerns regarding biodiversity, fragmentation, and fire ecology would be incorporated into this issue.

The following two issues (*) were analyzed together and discussed together to show the environmental consequences due to the similarity and inter-relationship of both of them.

***Old Growth:** There is a concern timber harvest and associated roadbuilding can remove components of old growth, reduce or eliminate the function of old growth habitat, and disrupt the processes that produced and continue to maintain old growth. Over time, habitats can be rendered unsuitable or less suitable for species that are associated with old growth. Old growth ecosystems are complex and generally require the passage of considerable time to be created. Therefore, the loss of old growth habitat and its attendant wildlife species is a concern. Concerns regarding biodiversity, fragmentation, and fire ecology would be incorporated into this issue.

***Snags and coarse woody debris:** There is the concern that removing trees that appear unhealthy from a timber-producing perspective, could impact the recruitment of large-sized snags and coarse woody debris. With time and natural tree decline, however, large-sized unhealthy trees are the individuals most readily recruited into large-sized snags and ultimately, large pieces of coarse woody debris. Over 50 species of wildlife depend on snags or coarse woody debris for nesting, roosting, feeding or loafing sites. Nearly 100 species, including bats, small mammals, amphibians, furbearers, woodpeckers, raptors, passerines, and waterfowl are known to use snags or coarse woody debris (WA Dept. of Wildlife 1995). Concerns regarding fire ecology would be incorporated in this issue.

Roadbuilding: There is the concern that high road densities could result from this proposed project. In general, high road densities decrease habitat security and quality for many wildlife species, compared to similar habitats without high road densities. In addition, high road densities can contribute to loss of snags and snag recruits due to firewood cutting. If roads are closed to vehicles, unauthorized access often occurs such that security or habitat quality is compromised. The presence of a road allows easier snowmobile, bicycle, foot and horseback traffic, even if roads are closed to vehicles.

Big Game Considerations: There is the concern that this project could impact big game, especially Elk security. Elk security is defined as a nonlinear block of hiding cover $\geq$ 250 acres in size and two mile from any open road. Collectively these blocks must equal at least 30% of an analysis unit (Hillis et al. 1991). Thus, elk security is a function of cover and road density, parameters discussed above. The synthesis of those two factors will be discussed in this concern. Other factors that relate to big game habitat quality such as overstory cover, movement corridors, and the absence of noxious weeds would be included as well.

SOILS:

The following two issues (*) were analyzed together and discussed together to show the environmental consequences due to the similarity and inter-relationship of both of them.

***Risks to Long-Term Soil Productivity-** There is the concern that timber harvest activities involved in this project could cause rutting, compaction and displacement of surface soils, which could cause an increase in erosion, reduce regeneration success and reduce productivity of forest vegetation.

***Cumulative Effects on Soil and Site Productivity-** There is the concern that repeated entries into harvest units with ground based skidding equipment in combination with existing roads, mining sites, and other lands out of production could cause increases in wide-spread soil compaction and disturbance, which could result in reduced site productivity, increased erosion, and increased sedimentation.

Noxious Weeds- There is the concern that timber harvest and road building activities will encourage the establishment and spread of noxious weeds, which would cause displacement of native vegetation and reduce forage for wildlife.

WATER:

Water Quality: Concern was raised that land management activities, such as timber harvest, prescribed burning, and road construction and use, could affect water quality primarily by accelerating sediment delivery to streams above natural levels. These impacts are caused by sediment produced by roads, skid trails in harvest units, and by the removal of vegetation along stream channels.

WQLS / TMDL's: Concern was raised that there are several Water Quality Limited Segments (*WQLS*) within Elk Creek (*a 303d listed stream*). Because of this listing, how would Total Maximum Daily Loads (*TMDL's*) be calculated, and would this project exceed those limits?

Channel Stability, Water temperature, and Peak Flows: Concern was raised that this project would affect channel stability, stream temperature, and peak flows primarily as a result of removal of forest canopy by timber harvest or prescribed burning.

FOREST VEGETATION AND TIMBER RESOURCES:

Fire Ecology: There is concern how timber harvest and prescribed burning would affect various fire dependant vegetation types and the effect of fire suppression on wildlife species and habitats within the area. Forest ecosystems in western Montana evolved with recurring fire. Many plant and animal species benefit from fire. Most western forest ecosystems have experienced extensive, effective fire suppression for the past 80-100 years. Timber harvest may or may not emulate effects of fire. Fire frequency, intensity, and effects to vegetation will be discussed in this issue. In addition, fire ecology will be incorporated into all habitat related issues listed above.

Decreased Growth and Vigor of Trees: There is a concern that not treating overstocked existing stands will perpetuate and/or contribute to decreased growth and vigor, which may adversely affect the long term contribution to trust income, and increase the influence of insects, diseases, and the risk of stand replacement wildfires.

Economic Benefits and Project Revenue: Concern has been raised that this proposed project might not be economically viable.

The issues identified that did not drive the development of the Action Alternative are as follows- These issues did not drive alternatives, but were analyzed for and addressed by applying the mitigations found in **Appendix C**.

WILDLIFE:

Endangered, Threatened, and Sensitive Species: Concern was raised that timber harvest and associated roadbuilding can remove or alter habitats associated with endangered, threatened, and sensitive species. As a result, populations could decrease and recovery efforts could slow.

WATER:

Riparian and Wetland Communities- Concern was raised that this project would have detrimental effects upon riparian and wetland communities, primarily through sedimentation, removal of large woody debris (*through prescribed burning and timber harvesting*) and trees necessary for shading of streams.

Native Fisheries- There is a concern that this proposed action would increase stream sedimentation, reduce shading cover, and reduce existing and future coarse woody debris, which could decrease available spawning habitat and instream cover needed by Bull Trout and Westslope Cutthroat Trout.

FOREST VEGETATION AND TIMBER RESOURCES:

Threatened, Endangered, and Sensitive Plants- There is a concern that the proposed action would alter crucial habitat for, threatened, endangered, sensitive plant species, which could reduce their abundance and slow population recovery efforts.

HUMAN CONCERNS:

Human Developments- Concern has been raised that this project would have adverse impacts on human developments (such as old mining buildings and rockwork) in the area.

Access Into Private Land within the Skimmerhorn Drainage- There is a concern that the closing of the Old Skimmerhorn Road would adversely affect the access into private lands located within the Skimmerhorn drainage in Sections 26, 27, and 34.

Cultural Resources- There is concern that this proposed project could adversely affect cultural resources within the area.

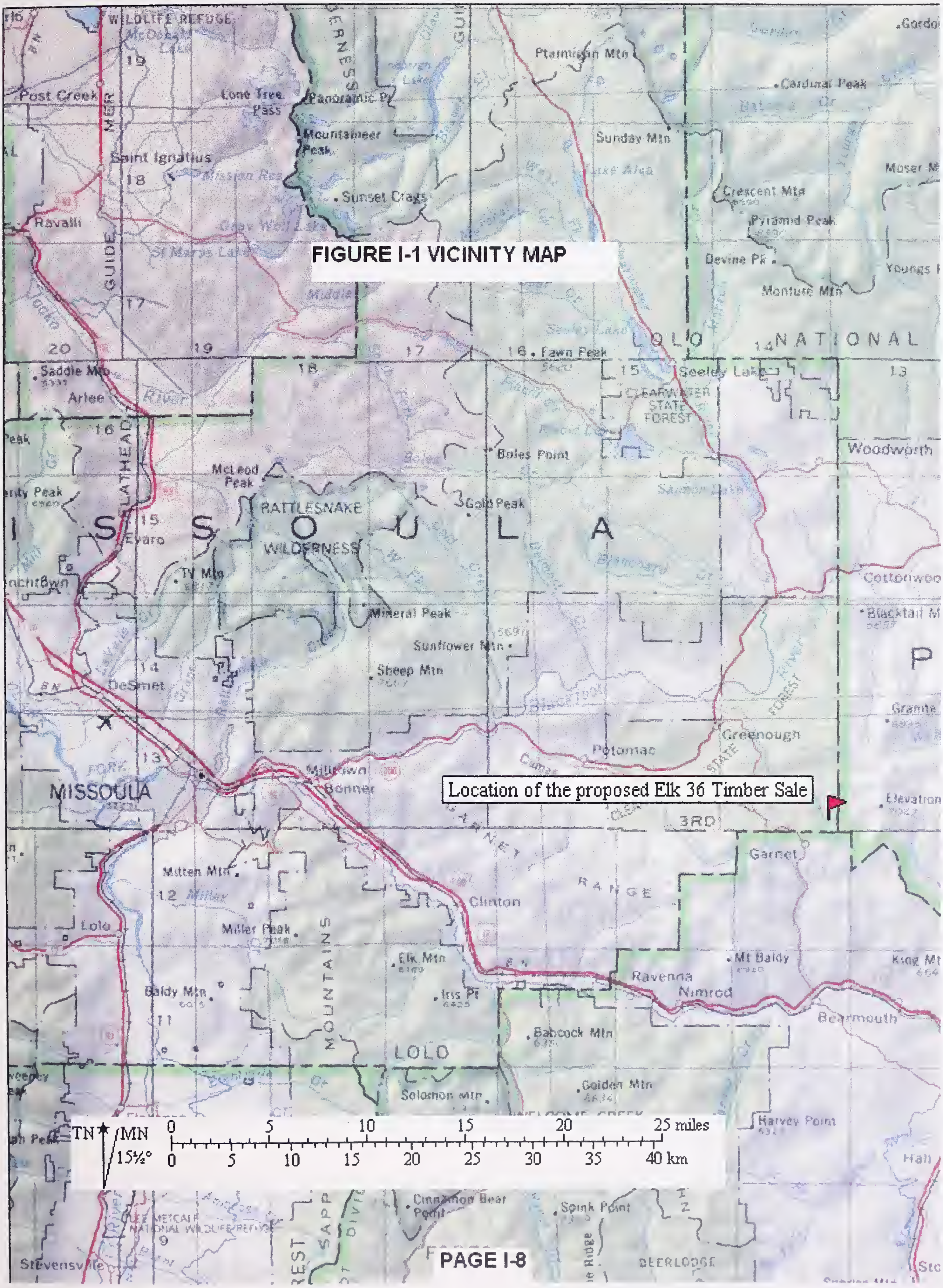
Asthetics- There is concern that this proposed project could adversely affect the visual resource enjoyed from the Garnet Range Road and the Elk Creek County Road Corridor.

The issues identified that were felt to be outside the scope of this proposed project are as follows-

Effectiveness and goals of Best Management Practices- Concern was raised regarding the effectiveness, cost, and intended goals of applying the best Management Practices (BMP's) to mitigate project impacts.

State Forest Land Management Plan- There is concern that all applicable objectives, guidelines, and standards of the State Forest Land Management Plan (*SFLMP*) must be met under this project.

FIGURE I-1 VICINITY MAP



Location of the proposed Elk 36 Timber Sale

CHAPTER 2
ALTERNATIVES

CHAPTER II
ALTERNATIVES

INTRODUCTION

Chapter II describes the No Action and Action Alternatives. Chapter II also summarizes the environmental effects from Chapter IV in a comparison table.

A. DEVELOPMENT OF ALTERNATIVES

The major environmental issues identified during the scoping process were defined and are summarized in Chapter I. In order to understand how the proposed Action Alternative would effect the environment, its effects were contrasted to those of the No Action Alternative. These effects are detailed in Chapter IV and shown in the comparison table at the end of this chapter.

The DNRC then identified the site-specific actions that would cause probable environmental effects as they related to the issues. Those involved in the project development formulated possible mitigations in accordance with the Resource Management Standards (RMS) in the SFLMP that could be applied to the proposed action to address the major issues. In developing the Action Alternative the SFLMP and RMS' were applied. The following RMS' are examples of how the RMS' and SFLMP were referred to:

1. Biodiversity RMS #s 4 & 5 and Silviculture RMS #9 were used to develop an Action Alternative in coordination with the BLM on adjoining lands.
2. Silviculture RMS #1 was used ensure long-term productivity of the soil and site and capability to produce trust revenue and hydrologic function.
3. Biodiversity RMS #s 1 & 4 were used to address Forest Fragmentation concerns.
4. Silviculture RMS #s 3,4, & 5 were used to ensure that accepted silvicultural prescriptions were used to promote quality of reserve trees and ensure diversity of species, age, and stand structures.
5. Road Management RMS #s 1,3,4,5, & 6 were used to develop a transportation plan for the Action Alternative.
6. Watershed RMS #7 was used for site specific prescription development.
7. Big Game RMS #1 was used for big game habitat direction.
8. Silviculture RMS #s 6 & 7 were used to develop an Action Alternative that is economically viable.
9. Watershed RMS #s 1,2,4,9, & 10 were used to develop an Action Alternative that would promote clean water and ensure protection of riparian resources.
10. Weed Management RMS #s 1 & 4 were used to develop an Action Alternative that manages existing weed populations and prevents introduction of new populations of noxious weed species.

Following implementation of the proposed Action Alternative, the project area should have stand structures and conditions more closely resembling those during pre-settlement times rather than those which exist at present. It was DNRC's intent when designing the Action Alternative to have the following attributes across the project area's landscape-

1. A diversity of tree sizes and species.

2. A diversity of treatment intensities and stocking levels.

3. Preservation of the existing large ponderosa pine and western larch by removing those shade tolerant trees which have become established due to fire suppression, and reduce the threat to large, old ponderosa pine, and western

larch trees caused by inter-tree competition, and ladder fuels.

4. Leave untreated, those acres of existing Old Growth (using the Green et. al. definition) in the Douglas-fir/western larch cover types that occur within the section.

5. Reintroduce fire into part of the section using cooperative prescribed burns with the BLM, and some burning done by DNRC personnel only.

B. DESCRIPTION OF ALTERNATIVES

1. NO ACTION ALTERNATIVE

Under the No Action Alternative none of the proposed timber harvesting, road construction and reconstruction, prescribed burning or forest improvement work would take place at this time. With regard to overall priority and available funds, improvements to existing roads (on State ownership) and road closures would be accomplished over time with the SWLO road maintenance program. Human activities occurring in the area, such as recreational use, fire suppression, road maintenance, firewood gathering, pre-commercial thinning, etc. would continue. Natural events, including plant succession, windthrow, and wildfire starts, would continue to occur. There would continue to be limited funding and opportunity to manage existing noxious weed populations, and introduction of new weed species would still be present. The implementation of the No Action Alternative would hinder cooperative transportation plans with the BLM. Future actions, which include timber harvesting, could be proposed and would go through the proper environmental analysis prior to implementation.

2. COMPONENTS COMMON TO BOTH ALTERNATIVES

Neither alternative proposes harvest activities in large riparian areas. The Action Alternative was designed to be in compliance with applicable laws and the standards set forth in the SFLMP. Laws, standards, and guidelines are applied to on-the-ground activities through the use of Special Operating Requirements within the Timber Sale Contract. Mitigation measures that apply to the Action Alternative are listed in **Appendix C.** Under both Alternatives, the DNRC and BLM would grant and receive from each other permanent easements for access. This easement exchange would include portions of existing road, and locations of roads that would be built should the Action Alternative be selected. A map of easements exchanged within the Elk Creek drainage is included with this document in **Appendix A map 2.1.** The complete easement exchange includes many road segments not involved with this project.

3. DESCRIPTION OF THE ACTION ALTERNATIVE

Tables 2.1 and 2.2 provide a graphic representation of the Action Alternative. A map is located in Appendix A map 2.2. Each stand within the project area would be treated in the following manner under the proposed Action Alternative:

Unit 3601 (Northern Unit) 53 acres-

Under the proposed Action Alternative, approximately **53** acres would be treated with a moderate severity fire emulation. Part of this unit would be skyline yarded with the majority of the unit harvested using ground-based equipment. Small "roundwood pulp" (trees not containing sawlog material) would be removed as well as sawlog material. This would be done to thin out diseased and slow growing trees, and to make the shift to longer lived seral species. The trees removed would be the members of the stand expected to die out if a moderate severity fire was to burn through the stand area. The trees remaining after harvest would generally be seral species. These trees also would be the healthiest and fastest growing, or those individual trees that may later provide some components of an old growth stand. Some trees would be left for snag replacement. Approximately **.69 miles** of permanent road and **.37 miles** of temporary road would be needed to access this proposed harvest unit and BLM harvest units. Approximately **.51 miles** of existing road would be improved to access Unit 3601 and Unit 3602. Logging slash would be lopped to within 18" of the ground. This unit includes areas that would be jackpot burned given timing, funding, and personnel constraints. Without jackpot burning, these areas would still meet the Hazard Reduction Act standards.

Unit 3602 (Middle Unit) 100 acres-

Under the proposed Action Alternative, approximately **100** acres of the ridge complex that divides a tributary of Kennedy Creek and Keno Creek / Elk Creek would be harvested, again using a moderate severity fire emulation. Approximately one third of the acres within the unit would be treated using skyline yarding, with the rest using traditional ground based harvesting equipment. Trees removed would be similar to the ones in unit 3601. Some areas requiring skyline yarding would also require the cutting and removal of pulp. If the pulp is not removed, the slash would be piled either by hand or using an excavator. Some areas would be treated using a commercial thinning approach to increase growth and vigor of residual trees. Lodgepole pine would also be left provided they were healthy and thrifty to "fill in the holes" between the more preferred western larch, ponderosa pine, and Douglas-fir. These lodgepole pine would "soften" the visual effects of harvest, provide downed woody debris (should they be windthrown), and would theoretically continue to grow and provide a greater return at the time of a future entry. Approximately **1.21 miles** of permanent road and **1.32 miles** of temporary road would be needed to access this proposed harvest unit and BLM harvest units. Approximately **.51 miles** of existing road would be improved to access Unit 3601 and Unit 3602. Logging slash would be lopped to within 18" of the ground. This unit includes areas that would be jackpot burned given timing, funding, and personnel constraints. Without jackpot burning, these areas would still meet the Hazard Reduction Act standards.

Unit 3603 (Southern Unit) 68 acres-

Under the proposed Action Alternative, approximately **68** acres of the state ownership southeast of the Keno-Kennedy / Elk Creek Road junction would be treated using a higher intensity, moderate severity emulation. Approximately one third of this unit would be treated using skyline yarding with the rest being treated using ground based harvesting methods. This unit is also proposed for a cooperative prescribed burn with the BLM. The reserve trees would be those expected to survive the prescribed fire (such as large western larch, ponderosa pine, and Douglas-fir) and be of suitable age and phenotype to act as seed trees. Some areas of small (non-merchantable) lodgepole will be left behind and burned. The type of harvest, combined with the adequate germination substrates formed by the burn would promote the species shift to longer lived seral species such as western larch and ponderosa pine. Approximately **1.42 miles** of permanent road would be needed to access this unit and BLM harvest units.

4. TREATMENT DESCRIPTIONS

The Action Alternative of the proposed Elk 36 Timber Sale would contain three main treatment units. The intent of these treatments is to meet the goals set out in chapter I of this E.A. and to obtain the desired conditions listed above. These units were designed to approximate the conditions one would expect with normal fire intervals, not the many years of fire suppression that has taken place. All proposed treatments would have traits that fall in the "Moderate Severity" fire class, but would have varying degrees of intensity. The current species cover, topography, and steepness of slope would determine the intensity. For example: a steep slope with primarily lodgepole would have few trees remaining after harvest, where a gentle slope with a high percentage of western larch and ponderosa pine would still have many large trees remaining.

UNIT 3601 (Northern Unit)

This area is characterized by gently rolling benches, ridges with many granite boulders, and occasional steep breaks. As stated earlier, a large crown run fire would not likely have been sustained due to this broken and gentle topography. Harvest here would target the removal of lodgepole pine, subalpine fir, Engelmann spruce, and small Douglas-fir. Occasional larger western larch and Douglas-fir would be removed, but would only be done to remove diseased members or to provide growing space and nutrients to healthier and more genetically desirable trees in close proximity. Existing snags would be left to provide nesting or feeding sites and to provide large coarse woody debris in the future. Some lodgepole pine and Douglas-fir with dwarf mistletoe (*Arceuthobium* spp.) would be left and would be girdled to prevent spread to the residual stand and future regeneration. These trees would be left for the same reasons listed above for snags. Residual trees would range from 25 - 60 trees per acre and would range from 30 - 80 square feet of basal area per acre. The unit would begin to have a fine-grained mosaic pattern. This is best described as a stand with many "clumps" of trees of similar age and small openings scattered between them. Areas within this unit may be jackpot burned to achieve slash hazard minimums and to promote adequate seedbeds for seral regeneration. This type of treatment should favor the establishment and growth of seral species such as western larch and ponderosa pine and be similar to the effects of a lower intensity moderate severity wildfire.

UNIT 3602 (Middle Unit)

This unit is very similar to unit 3601 in topography and stand composition, but has several larger patches of nearly solid lodgepole. Some of these patches are comprised of small dense thickets, commonly known as "dog hair". These areas have little commercial value, but do provide hiding cover for large game animals. These "dog hair" thickets have been left out of the proposed sale area for the most part, however, some would be left untouched inside the proposed harvest unit to provide vertical diversity and hiding cover. Other areas of larger lodgepole pine would be treated. Where possible, they would be thinned to promote growth. The reserve trees would be free of dwarf mistletoe and be among the more thrifty members of lodgepole within the proposed harvest unit. Where possible, other species such as western larch, Douglas-fir, and ponderosa pine would be favored. Residual trees would range from 25 - 80 trees per acre and would range from 30 - 90 square feet of basal area per acre. The unit would begin to have a fine-grained mosaic pattern. Openings created by harvest would be larger than the ones in unit 3601. This would emulate the disturbance created by lower intensity underburns that would have occasionally flared up into the crowns of mature trees. As with Unit 3601, some areas may be burned to decrease slash hazards and to promote seedbeds for seral species. This type of treatment would favor the establishment and growth of seral species such as western larch and ponderosa pine.

UNIT 3603 (Southern Unit)

This unit has different topographic and stand characteristics than 3601 and 3602. Unit 3603 has longer sustained slopes without the broken "benchy" topography found in the units to the north. This proposed unit would emulate the higher intensity end of the scale of a moderate severity wildfire. It is likely for a fire to sustain a crown run from the toe of the slope to the ridge top. The proposed treatment for this unit includes a cooperative prescribed burn with the BLM. Reserve trees would be capable of surviving the heat and flames of the prescribed fire. Western larch, ponderosa pine, and thick bark Douglas-fir would be left as reserve trees. Thin bark species such as lodgepole pine, subalpine fir, and Engelmann spruce and young Douglas-fir would not be able to withstand the heat and direct flame impingement. Some smaller Douglas-fir may be left as reserve trees provided they have relatively high live crowns. Some of these trees may be killed and would provide feeding habitat for some birds before becoming coarse woody debris. Several pockets of small pole sized lodgepole would be left and would support small crown runs. These areas would also provide feeding sites, provide vertical diversity, and improve the aesthetics of the harvest unit. Large "cull" trees (those with extensive rot or decay) would be left, provided they were well within the harvest unit and would not provide a source for embers that would ignite spot fires outside the burn unit. These trees would continue to supply nesting and feeding habitats as long as they remained standing, and would provide coarse woody debris when they fell over. The residual trees would range from 5 - 30 trees per acre and would range from 10 - 60 square feet of basal area per acre. This type of prescription would favor regeneration of western larch and ponderosa pine and would be similar to a seed tree type of harvest. Should regeneration not occur, or be in numbers lower than expected, interplanting with long-lived seral species would occur.

5. ALTERNATIVES CONSIDERED BUT ELIMINATED

Early in the development process, DNRC considered harvest treatments to the west of Elk Creek in sections 35 and 36 of T. 13 N., R. 14 W. M.P.M.. This area was eliminated from consideration for the following reasons:

a. These areas did not lend themselves as well to cooperative management at this time compared to the areas included within the Action Alternative.
b. As part of the basin analysis mentioned in Chapter I, it was determined that the area west of Elk Creek deviated less from pre-settlement conditions than does the area within the Action Alternative. The area eliminated could be entered within the next 10 to 20 years.
c. The area eliminated would require extensive roading to achieve management needs, and the DNRC was unsure if the project would remain economically viable.
d. There was concern that further management at this time would increase the chances of meeting or exceeding TMDL levels.

6. SUMMARY OF ENVIRONMENTAL EFFECTS

Table 2.3, *SUMMARY OF ENVIRONMENTAL EFFECTS*, summarizes the primary environmental consequences of the alternatives by resource issue and describes several design features specific to the issue. The basis for the conclusions of environmental consequences summarized here is discussed in more detail in Chapters III, IV, and the associated resource appendices.

Table 2.1

Treatment Acres by Geographic Area Within the Proposed Elk 36 Timber Sale*

(Sec. 36, T. 13 N., R. 14 W. M.P.M.)

Geographic Area	**Unit**	**Acres Treated**	**Acres Total**	**% acres treated**
North of Kennedy Creek tributary	3601	48	133	36
Ridge feature between Kennedy Creek tributary and Keno Creek and Elk Creek	3602	113	132	86
Area Southeast of Elk Creek - Keno / Kennedy Road junction	3603	67	88	76
Area West of Elk Creek	NONE	0	284	0
Section 36	----------	228	640	36

- all acreages are estimates using dot grid analysis

TABLE 2-2 PROPOSED ACTION ALTERNATIVE

Estimated total area within harvest units - **228**

Harvest Method: Moderate Severity Fire Event Emulation **(M.E.)**
Low intensity- **161 acres**
High intensity- **67 acres**

The above harvest regimes were chosen to best emulate the historic fire patterns that each harvest unit would most likely have been subjected to. The intent of each harvest activity would be to offset the effects of wildfire suppression and return the treated stands to a condition, which more closely resembles that which existed historically.

Estimated Volume Yield: 0.5 - 1.5 MMBF

Road Construction	**Type of Construction**	**Permanent or Temporary**	**Distance**
	New Construction	Permanent	3.32 miles
		Temporary	1.69 miles
		Total	5.01 miles
	Road Improvement	Permanent	0.51 miles
	TOTAL		**5.52 MILES**

SUMMARY

UNIT	HARVEST METHOD	TOTAL ACRES	HARVEST TREATMENT	POST-HARVEST TREATMENT
3601	M.E. Low (ground)	42	Removal of unmarked sawlog and pulp mandatory	Lop and scatter slash to below 18" in height. Potential jackpot burn.
3601	M.E. Low (line)	6	Removal of unmarked sawlog mandatory, pulp trees must be severed, optional removal of pulp,	Lop and scatter slash to below 18" in height. Potential jackpot burn.
3602	M.E. Low (ground)	75	Removal of unmarked sawlog and pulp mandatory	Lop and scatter slash to below 18" in height. Potential jackpot burn.
3602	M.E. Low (line)	38	Removal of unmarked sawlog mandatory, pulp trees must be severed, optional removal of pulp,	If pulp is not removed, slash must be hand or excavator piled to three tons per acre or less, burn piles. If pulp is removed, lop and scatter slash to below 18 " in height. Potential jackpot burn.
3603	M.E. High (ground)	45	Removal of unmarked sawlog mandatory, optional removal of pulp.	Broadcast burn, evaluate need for planting within two years after burn.
3603	M.E, High (line)	22	Removal of unmarked sawlog mandatory, optional removal of pulp.	Broadcast burn, evaluate need for planting within two years after burn.

* For a more detailed explanation of each harvest method, please see chapter 2

ROAD NAME	TYPE	DISTANCE	OPEN TO PUBLIC?
Autumn	Temporary	1760 feet	No
Anniversary	Permanent and temporary	3670 ft (perm.) 1810 ft (temp)	No
Oct. 23	Temporary	150 feet	No
Allyson	Permanent and temporary	6400 (perm) 1540 ft (temp)	No
Khabibulin	Temporary	1960 feet	No
Kat	Temporary	1690 feet	No
Ned's	Permanent	7500 feet	No
Keno -Kennedy	Permanent (improve existing)	2700 feet	Yes

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
OVERSTORY COVER AND MOVEMENT CORRIDORS	Although the project area has been extensively harvested, considerable overstory cover still occurs there, the section is relatively inaccessible. Potential movement corridors occur along ridgetops and along riparian areas.	***No Action-*** No short term changes, no roads would be built and security would remain high, risk of stand replacement wildfire would increase creating the potential of long-term negative effects	***No Action-*** increased potential for long-term negative effects due to stand replacement wildfire.	***No Action-*** Wildfire suppression would continue.
		Action- Little expected change along Elk Creek corridor. Ridge top corridor would be roaded and harvested decreasing remoteness. Large unentered patches would retain current cover. There would be a general decrease in the risk of stand replacement wildfire.	***Action-*** In conjunction with the BLM sale, there would be short-term decreases to overstory cover. Increased long-term benefits to retention of cover by decreasing the risk of stand replacement wildfire.	***Action-*** Wildfire suppression would continue. Newly constructed roads would be closed to public use. Larger trees would be reserved, most changes to the canopy would occur at middle and lower portions of the canopy. Unentered patches, riparian areas, and the west side of the section would remain intact and would ameliorate effects.
OLD GROWTH, SNAGS, AND COARSE WOODY DEBRIS	Currently, the project area does not have any old growth stands (Green et. al.). Two stands met the former DNRC old growth definition, neither are included in the sale proposal. Most of the project area has been harvested and is now relatively low on large-sized snags. Medium-sized trees could grow into large-sized trees and into large-sized snags.	***No Action-*** Understory trees would continue to compete with the overstory trees. Species would eventually shift to more shade tolerant species. Fewer medium sized trees would grow into larger size classes. Increased short-term benefit through decadence. Long-term negative effects due to a decrease in smaller trees, snags, and coarse woody debris. Increased potential risk of stand replacement wildfire.	***No Action-*** Decrease in growth would cause a long-term negative cumulative effect on potential old growth stand attributes. Implementation of only the BLM project would decrease risk of stand replacement wildfire within the analysis area, however the risk of stand replacement wildfire within section 36 increases. Short-term increase in coarse woody debris and snags through decadence.	***No Action-*** Wildfire suppression would continue.
		Action- No old growth under the current DNRC definition would be harvested. Harvest would decrease competition. Stress on reserve trees would decrease and growth would result. Increased growth in medium sized trees would allow them to reach larger size classes sooner. Road building and landing placement cause a low short-term negative effect to snags and coarse woody debris. Gates on all new roads decrease the chance of firewood cutting and increase snag survivability. Decreased risk of stand replacement wildfire. Diversity would be maintained.	***Action-*** An increase in overall patch size would be a long-term cumulative benefit. Decreased risk of stand replacement wildfire providing a long-term cumulative benefit. Increased growth and the associated increased size classes would provide a long-term benefit. This would provide a long-term cumulative benefit to old growth associated species within the analysis area.	***Action-*** Wildfire suppression would continue. All newly constructed roads would be gated. The largest size classes would generally be left. Unentered areas within the immediate project area; riparian zones, and the western portion of section 36, would remain unharvested at this time to ameliorate effects to snags and coarse woody debris.

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
ROAD BUILDING	In the project area, old roads and skid trails are evident. Currently, only the main Elk Creek Road and the Keno-Kennedy Road are drivable. The Keno Creek road is walkable.	***No Action-*** No changes to wildlife security. Section 36 would still lack an infrastructure for management.	***No Action-*** Net long-term benefit when allowing 2.13 miles of road revegetate.	***No-Action-*** Continue to let 2.13 miles of road revegetate.
		Action- Permanent driveable road densities would increase to 4.52 miles/square mile. This is classified as high. Negative impacts could include a reduction in snags and downed logs, habitat loss and fragmentation, increase in negative human/animal interactions, displacement, and a movement barrier. Roads will provide an infrastructure for future management and wildfire suppression providing a long-term benefit.	***Action-*** Slight increase in negative impacts due to reduction in habitat security.	***Action-*** Gated roads and steep broken terrain decrease non -management related uses. Slashing of temporary road surfaces will further decrease non-management use. The area will remain in a "walk-in area" and violators will continue to be prosecutable. Continue to let 2.13 miles of old road revegetate.
BIG GAME CONSIDERATIONS	Moose yearlong home ranges include portions of Section 36. Habitats used by moose include riparian bottoms and aspen sites. Important areas occur in the northeast corner of Section 36, and along Keno Creek. It is not a key security area for elk. Forested cover habitat patches are small and road density relative to cover patches is high. These conditions contribute to low habitat suitability for elk.	***No Action-*** No changes in current conditions. Long-term negative impact with increased risk due to stand replacement wildfire.	***No Action-*** The proposed burning (both with and without harvest) involved with the BLM project would increase browse species.	***No Action-*** Wildfire suppression would continue.
		Action- Limited harvest in areas used by moose. No harvest within riparian areas (preferred by moose). Minor negative effects in upland areas due to the removal of snow intercept cover. Increased road density increases hunting pressure. Harvest and burning would increase preferred shrub species in amount and health and benefit big game.	***Action-*** Cooperative management through harvest and burning with the BLM would increase patch size and increase forage. This would benefit to big game. Roads and harvest units would decrease hiding cover and increase hunting pressure. This would have a negative impact upon big game.	***Action-*** Wildfire suppression would continue. Gates and slashing of temporary roads will decrease non-management use.

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
RISKS TO LONG-TERM SOIL PRODUCTIVITY	Soils are shallow to moderate depth, gravelly sandy loams weathering from granitics. These soils are excessively well drained. Erosion hazard is high on bare granitic soils and increases with slope. Compaction hazard is low. These soils have a long season of use.	***No Action-*** Little direct effect on soil resources. Existing skid trails and roads with inadequate drainage would continue to erode. Existing skid trails that are revegetating will slowly stabilize.	***No Action-*** Cumulative effects could occur from repeated ground based entries into the harvest area with each entry depending on the area and degree of impacts. Previous harvest and mining activities built extensive roads and trails in the section. Placer mining along Elk creek was reclaimed in 1984. Old harvest south of Keno creek used extensive skid trails and some steep roads that are mostly revegetated.	***No Action-*** Existing closed roads and skid trails will continue to be allowed to revegetate.
		Action- Timber harvest, slash disposal and site preparation activities can cause rutting, erosion, soil compaction and displacement. Potential for soil impacts is higher on tractor units and below average on cable units. Slash, needles and coarse woody debris CWD (a minimum 10-15 tons/acre >3" dia.) would be retained on site to provide for long term nutrient cycling. Broadcast burning should have a short-term beneficial effect on soil nutrients. There would be some minor long-term effect to soils associated with road relocation, that would be balanced by improved roads and stabilizing old roads.	***Action-*** The Action Alternative involves ground skidding that could result in cumulative effects if the area and degree of impacts is not limited. Any future harvest would likely use the same road system and skid trail planning and therefore presents low risk of cumulative effects. Large woody debris will be retained for nutrient cycling and long term productivity and therefore presents modest risk of cumulative effects to soil productivity.	***Action-*** Any future harvest would likely use the same road system and skid trail planning and therefore presents low risk of cumulative effects. Large woody debris will be retained for nutrient cycling and long term productivity and therefore presents modest risk of cumulative effects to soil productivity. A general skidding plan will be in place prior to equipment operations. Tractor skidding should be limited to slopes less than 40%. Retain 10 to 15 tons large woody debris and all fine litter feasible following harvest.
NOXIOUS WEEDS	Noxious weeds, mainly knapweed (*Centaurea maculosa*) and spots of thistle (*Cirsium arvense*) occur within the project area. Knapweed occurs as spot infestations on roadside edges within the State section. South slopes are at higher risk of weed establishment.	***No Action-*** Noxious weeds, principally knapweed would continue to spread along existing roads and onto drier vegetation types, mainly south slopes.	***No Action-*** With continued spread, noxious weeds eventually decrease forage species and "crowd out" native plants and plant communities.	***No Action-*** The DNRC will continue to spray large infestations of noxious weeds where possible. In other areas, biological methods may be tried.
		Action- Ground disturbing activities have the potential to introduce or spread noxious weeds in susceptible habitat types. Integrated Weed Management (IWM) approach would be implemented. Short-term effect would be to reduce existing noxious weed populations and increase native plants and seeded grasses.	***Action-*** Effective weed management would provide a cumulative benefit to the area.	***Action-*** To decrease weed spread and introduction all equipment would be washed before any work could begin. An IWM including grass seeding, spraying, and biological controls would be put into place to control existing and introduced weed populations.

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
WATER QUALITY	Many of the streams in the affected environment have been impacted by accelerated rates of sedimentation. Historic and recent mining, the existing road system and current gazing management practices have contributed to these impacts. Data collected from Lower Elk Creek and Kennedy Creek indicates that water quality in these streams is impaired. Water quality impacts in both these drainages are largely attributed to road related delivery of sediment. Several segments of existing road are eroding and were determined to be contributing direct sediment delivery to streams or at risk of contributing to direct delivery.	***No Action-*** Water quality would remain at or near current levels in all drainages directly impacted by the project. Old roads and skid trails would continue to revegetate and sediment would eventually decrease from those sources. The old Skimmerhorn Road would continue to contribute sediment. The area would continue to be at risk of stand replacement wildfire, increasing the risk of long-term negative effects.	***No Action-*** Water quality would remain at or near current levels in all drainages that would be directly impacted by the project. The old Skimmerhorn Road would continue to contribute sediment. The area would continue to be at risk of stand replacement wildfire, increasing the risk of long-term negative effects.	***No Action-*** Wildfire suppression would continue.
		Action- Old roads and skid trails would continue to revegetate and sediment would eventually decrease from those sources. Approximately 2.13 miles of the lower standard existing road would be permanently closed. Some short-term increases in sediment delivery may occur during and/or shortly after the installation of proposed new culverts. Application of BMPs, and site-specific design and mitigation measures are expected to reduce erosion and potential sediment delivery. The old Skimmerhorn Road will be improved to reduce erosion. The risk of stand replacement wildfire will be reduced providing a long-term benefit. The proposed road construction, road abandonment and road improvement activities are not expected to result in long-term or substantial short-term impacts to water quality. The proposed road improvements and abandonment are expected to result in reduced erosion and sediment delivery to streams and ephemeral drainage features. improved water quality, improved protection of cold-water fisheries and other downstream beneficial uses when compared to the current existing conditions.	***Action-*** The proposed action includes plans to address and correct these problems and reduce long-term erosion and sediment delivery concerns. The risk of stand replacement wildfire will be reduced providing a long-term benefit.	***Action-*** BMP's, the Streamside Management Act, and the Federal Clean Air and Water Act will be followed. Improvements will be installed to reduce the extensive erosion that is occurring on the old Skimmerhorn Road on State Land. Provide for adequate road surface drainage on all temporary or abandoned roads that will not require periodic maintenance. Protect ephemeral draws, springs and other wet areas with marked equipment restriction zones. If absolutely necessary, designate locations for skid trail crossings. Use designated crossings only under dry or frozen conditions. Comply with all stipulations set forth in the 124 permit and site specific alternative practices granted under the SMZ Law and Rules. Wildfire suppression would continue.

RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
WQLS / TMDL'S	Elk Creek and Union Creek are on the Mt. DEQ 303(d) list. Keno Creek and Washoe Creek were removed from the revised 303(d) list while Kennedy Creek was not considered a water Quality limited stream.	***No-Action-*** No change is expected for these streams. See Table 2.3 page 4 *Water Quality*.	***No-Action-*** See Table 2.3 page 4 *Water Quality*.	***No-Action-*** See Table 2.3 page 4 *Water Quality*.
		Action- See Table 2.3 page 4 *Water Quality*.	***Action-*** See Table 2.3 page 4 *Water Quality*.	***Action-*** See Table 2.3 page 4 *Water Quality*.
CHANNEL STABILITY, WATER TEMPERATURE, AND PEAK FLOWS	Estimated levels of existing water yield increase (WYI) due to management activities in Elk Creek, Kennedy Creek and Keno Creek are relatively low. The predicted WYI are well below those levels normally associated with detrimental impacts to stream channel stability and fisheries habitat. The mainstem of Elk Creek within the proposed timber sale area has been extensively placer mined in the past. Channel form and function has been greatly altered by the intensive level of disturbance. Kennedy Creek was rated at "fair" to "good" channel stability. Channel conditions for Keno Creek were rated as "good".	***No-Action-*** No change is expected. See Table 2.3 page 4 *Water Quality*.	***No-Action-*** See Table 2.3 page 4 *Water Quality*.	***No-Action-*** See Table 2.3 page 4 *Water Quality*.
		Action- See Table 2.3 page 4 *Water Quality*. No impacts to water quality, cold-water fisheries or other downstream beneficial uses are expected to result from the proposed harvest activities. Implementation of the proposed action alternative is expected to reduce long-term erosion and risk of sediment delivery to streams and draws draining the State parcel. Implementation of the proposed action alternative would meet the requirements of new and ongoing activities conducted in 303(d) listed streams prior to TMDL development.	***Action-*** See Table 2.3 page 4 *Water Quality*. Estimated water yield increases under the proposed action alternative are similar to those levels estimated under exiting conditions and predicted under a mixed severity fire regime under natural conditions. Based on this analysis, no detrimental cumulative watershed effects due to increased levels of water yield (increased magnitude or duration of peak flows) are expected to result from the proposed timber harvest and road construction (both BLM and DNRC projects). Populations of Bull Trout located downstream in the Blackfoot River will not be affected by the proposed action. No cumulative effects are expected in conjunction with BLM harvest.	***Action-*** See Table 2.3 page 4 *Water Quality*.

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
FIRE ECOLOGY	Much of the project area is within fire groups 6 and 9. Heavier stocking than pre-settlement due primarily to the loss of the natural role of fire. Ladder fuels and high stocking have changed the way a fire would potentially burn in the area by increasing the risk of higher severity fires.	***No Action-*** The risk of stand replacement fire would continue and become more significant. Fire severity would continue to depart from the natural mixed severity regime of pre-settlement conditions. DNRC would not re-introduce fire into the proposed project area. There would not be any prescribed fire therefore, no smoke contributed to the airshed. No roads would be built.	***No Action-*** The risk of large wildfire affecting the drainage would become more significant. This could adversely impact the adjoining lands. Large stand replacement wildfire is a departure from pre-settlement conditions.	***No Action-*** Fire suppression would continue.
		Action- Harvest would be done to emulate a mixed severity fire regime and approximate the pre-settlement conditions. Prescribed fire would be used to decrease slash load and to reintroduce fire into the project area. Smoke from the prescribed fire would be introduced into the airshed. There is a risk that the prescribed fire could escape control. The combination of harvest and prescribed fire would promote establishment of seral regeneration. Roads built would assist in fire suppression.	***Action-*** The proposed Action Alternative in conjunction with the BLM project would provide a cumulative benefit to the reduction in large fire risk within the general area. The large cooperative prescribed burn could impact the airshed.	***Action-*** Fire suppression would continue. Silvicultural practices would attempt to emulate the mixed severity fire regime. A burn plan would be in place prior to any prescribed burning. The BLM and DNRC are members of the Montana Airshed Coordination Group. Units would be designed to provide for easier control during prescribed burning.
DECREASED GROWTH AND VIGOR OF TREES	The project area is currently dominated by small lodgepole pine and Douglas-fir. Much of this is regeneration from the trees that were left after the last harvests. The stands are crowded and there is inter-tree competition for limited resources (water, nutrients, and light). The decrease in resources for tree growth often leads to poor vigor, poor growth, and puts stands at risk of insect and disease epidemics.	***No Action-*** A continued decrease in growth and vigor would result. Shade tolerant climax species would continue to dominate regeneration. Stands would move further away from appropriate conditions (pre-settlement). There would be an increased risk of stand replacement wildfire and insect and disease infestations. Water and nutrients important to tree growth would continue to be limited.	***No Action-*** Increased risk of stand replacement and large wildfire. Increased risk of insect and disease infestations growing to epidemic levels.	***No Action-*** Fire suppression would continue. Salvage operations would continue although opportunity is quite limited due to lack of road infrastructure.
		Action- The largest and fastest growing long-lived seral species would be retained under the Action Alternative. This in combination with prescribed burning would promote seral regeneration. The increase in available water and nutrients would increase growth and vigor. Increased growth and vigor decreases the chance of insect and disease infestation. Harvest and prescribed fire would provide a short-term increase in available nutrients. The risk of stand replacement wild fire would be decreased. The implementation of forest management would shift stands toward appropriate conditions.	***Action-*** The proposed project would decrease the chance of stand replacement wildfire. Increased stand vigor and health would decrease the risk of insect and disease epidemics.	***Action-*** Fire suppression would continue. Silvicultural treatments would attempt to emulate mixed severity fire events. Reserve trees would primarily be the largest, healthiest, and fastest growing members of the seral species present. Salvage opportunities would be greatly increased due to the construction of a road infrastructure.

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
ECONOMICS, BENEFITS, AND EXPECTED REVENUES	Currently there are not any active mining claims, grazing permits, or cabin sites within section 36. Aside from occasional recreational use, there is no economic contribution to the School Trusts from this section at this time. Proceeds from this proposed action would go to the Public School account of the School Trust.	***No Action-*** No economic contribution or benefits to the School Trust would occur above the current sale of the State Lands Recreational Use License from this section within the foreseeable time frame. This would have a direct effect upon the School Trust and DNRC's obligation to provide the School Trusts with income from Trust Lands.	***No Action-*** It could be assumed that the selection of this alternative would have a short-term cumulative effect upon timber jobs in the Blackfoot area.	***No Action-*** Sale of State Lands Recreational Use Licenses would continue. Cabin sites, grazing leases, and mining leases would continue to be an option.
		Action- The investment into the road infrastructure within this section would be $77,280. This investment would decrease future management costs within this section. The forest improvement collections would be approximately $26,175. This money would be deposited in the forest improvement fund to be used for thinning, prescribed burning, planting, weed management, etc. on Trust lands. The projected net return for this alternative to the School Trust endowments is $45,045.	***Action-*** If this proposed project was implemented, it would provide work for a road building contractor, a logging contractor, their subcontractors, and their employees. The forest products would most likely be processed local mills providing further job opportunities.	***Action-*** Sale of State Lands Recreational Use Licenses would continue. Cabin sites, grazing leases, and mining leases would continue to be an option. The sale would not be sold and the project would not continue unless a minimum bid was met or exceeded. The minimum bid would be in place to guarantee a net profit for the Trust Lands.
ENDANGERED, THREATENED, AND SENSITIVE SPECIES (AND OTHER SPECIES OF INTEREST)	No occurrence of Endangered, threatened, or sensitive wildlife species is known to occur within the project area at this time. For a complete listing of the TES species analyzed for and their existing environments please refer to chapter III section IV A of this document.	***No Action-*** There would not be any direct or cumulative effect to these species primarily due to their absence from the area. Some effects could occur due to changes to the forest stands with the absence of wildfire. There would continue to be a departure from stand and species composition away from the habitat requirements needed. The risk of stand replacement wildfire would also increase.	***No Action-*** The risk of stand replacement wildfire would also increase. If a stand replacement wildfire was to occur, some species (Black-Backed Woodpeckers for example) could benefit.	***No Action-*** Fire suppression would continue.
		Action- There would not be any direct or cumulative effect to these species primarily due to their absence from the area. The risk of stand replacement wildfire would be diminished. The regeneration following harvest and prescribed burning could benefit Lynx.	***Action-*** There would not be any direct or cumulative effect to these species primarily due to their absence from the area. The risk of stand replacement wildfire would be diminished. The regeneration following harvest and prescribed burning could benefit Lynx.	***Action-*** Fire suppression would continue. If any endangered or threatened species were encountered during project planning or implementation, all project-related activities would cease and a DNRC wildlife biologist would be informed immediately. Additional habitat protection measures would be designed and implemented as appropriate.

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
RIPARIAN AND WETLAND COMMUNITIES	Please refer to Table 2.3 pages 4 and 5 for existing conditions.	***No Action***- See Table 2.3 *Water Quality*	***No Action***- See Table 2.3 *Water Quality*	***No Action***- See Table 2.3 *Water Quality*
		Action- See Table 2.3 *Water Quality*	***Action***- See Table 2.3 *Water Quality*	***Action***- This proposed action would remain outside of all riparian areas and wetlands for harvest, with the only entry being for road construction with the appropriate 124 permits from Montana DFWP.
NATIVE FISHERIES	Downstream from Cap Wallace the mainstem was found to contain populations of brook, cutthroat, rainbow, and brown trout; mountain whitefish, longnose sucker, coarsescale sucker, longnose dace and sculpin. The reach extending from Cap Wallace to Yreka Flats and the upper reach above Yreka were both found to only contain brook trout. Overall habitat conditions in Elk Creek can be summarized as having low habitat diversity with a preponderance of riffle habitat and a low number of pools, and low amounts of large woody debris.	***No Action***- No effects, adverse or cumulative are expected with the No-Action Alternative.	***No Action***- No effects, adverse or cumulative are expected with the No-Action Alternative.	***No Action***-
		Action- No effects, adverse or cumulative are expected with the Action Alternative.	***Action***- No effects, adverse or cumulative are expected with the Action Alternative.	***Action***- No harvest in riparian areas.
THREATENED, ENDANGERED, AND SENSITIVE PLANTS	There are no recorded species within the proposed project area. *Cypripedium parviflorum*, the Small Yellow Lady's-Slipper, has been recorded (1924) in section 2, T.12 N., R .14 W. approximately one mile to the southwest of the proposed project area. In 1992, relocation was attempted throughout the area without success. No other TES plants have been recorded in the area.	***No Action***- There are no foreseen direct or cumulative effects expected under this alternative.	***No Action***- There are no foreseen direct or cumulative effects expected under this alternative.	***No Action***-
		Action- There are no foreseen direct or cumulative effects expected under this alternative.	***Action***- There are no foreseen direct or cumulative effects expected under this alternative.	***Action***- If any endangered or threatened species were encountered during project planning or implementation, all project-related activities would cease and a DNRC wildlife biologist would be informed immediately in the event the TES specie was an animal. The MNHP society would be notified and asked for assistance if it were a plant specie. Additional habitat protection measures would be designed and implemented as appropriate.

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS

RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
HUMAN DEVELOPMENTS	Within the project area there are limited human developments. There is an old cabin located near the junction of Keno-Kennedy and Elk Creek roads where the proposed "Ned's Road" would leave the Elk Creek Road. There are some remnants of the rockwork put in place by Chinese miners upstream from the old mining claim in the same area.	***No Action-*** There are no foreseen direct or cumulative effects expected under this alternative. Aging of structures and potential vandalism would continue to be risks.	***No Action-*** There are no foreseen direct or cumulative effects expected under this alternative. Aging of structures and potential vandalism would continue to be risks.	***No Action-***
		Action- Under this alternative, no activity would take place in the vicinity of the Chinese rockwork. Therefore, no direct or cumulative effects are expected under this alternative. The cabin upstream from the junction of Keno-Kennedy Road and Elk Creek road would be in the immediate vicinity of the proposed junction of Elk Creek Road and the proposed "Ned's Road". Contract language and road layout would protect the cabin from damage during road building. Some out buildings (constructed in recent years and not associated with the cabin) would be torn down as they are within the proposed road right-of-way. Aging of structures and potential vandalism would continue to be risks.	***Action-*** No direct or cumulative effects are expected under this alternative.	***Action-*** If further human developments are found within the project area, the DNRC Archeologist would be informed. If needed a formal investigation would be made. If necessary, a change in sale design or acreage may be needed to protect the resource. Contract language and road layout would protect the cabin from damage during road building.
PRIVATE LAND ACCESS USING THE OLD SKIMMERHORN ROAD	The old Skimmerhorn Road is located in the far northwest corner of section 36. This road has been used for access of the private holdings within the Skimmerhorn drainage. Although this road has been left open by the DNRC for this reason, it is a poorly located and poorly designed road that contributes sediment into an unnamed tributary of Elk Creek.	***No Action-*** Under this alternative, no foreseen direct or cumulative effects are expected. Erosion of the road surface would continue, as would sediment delivery. No erosion control features would be put into place. The road would remain open until a new access road would be built as part of a future project.	***No Action-*** Under this alternative, no foreseen direct or cumulative effects are expected. Erosion of the road surface would continue, as would sediment delivery. No erosion control features would be put into place. The road would remain open until a new access road would be built as part of a future project.	***No Action-***
		Action- Some erosion control features would be put into place. The road would remain open for access into private land in the Skimmerhorn drainage. Some of these erosion control features would be fairly abrupt to prevent their erosion and to remain effective for several years. Design and construction of a new access road would be a part of a possible future project.	***Action-*** Other than the installation of erosion control and drainage features, no other direct or cumulative effects are foreseen under this alternative.	***Action-*** BMP's would be followed while designing and constructing the erosion control features

Table 2.3 SUMMARY OF THE ENVIRONMENTAL EFFECTS
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RESOURCE ISSUE	EXISTING CONDITION	DIRECT EFFECTS OF THE ALTERNATIVES	CUMULATIVE EFFECTS OF THE ALTERNATIVES	MITIGATIONS TO THE EFFECTS OF THE ALTERNATIVES
CULTURAL RESOURCES	Within the project area, the only known cultural resources are the Chinese rockwork and the old cabin mentioned in *Human Developments*. No other cultural or archeological sites have been determined.	***No Action-*** Under this alternative no treatments would take place within the proposed project area. No foreseen direct or cumulative effects are expected. Natural agents (fire, weathering, etc.) would continue.	***No Action-*** Under this alternative no treatments would take place within the proposed project area. No foreseen direct or cumulative effects are expected. Natural agents (fire, weathering, etc.) would continue.	***No Action-*** Fire suppression would continue.
		Action- No proposed activity is planned within the immediate vicinity of any known cultural resources (cabin and Chinese rockwork). No other cultural resources are known within the proposed project area. The DNRC archeologist has not recommended any further investigative work. Timber harvesting, road building, and prescribed burning as well as the natural agents mentioned above could damage undiscovered cultural resources. Since no known cultural resources exist within the project area, no foreseen direct or cumulative effects are expected. Natural agents (fire, weathering, etc.) would continue.	***Action-*** Since no known cultural resources exist within the project area, no foreseen direct or cumulative effects are expected. Natural agents (fire, weathering, etc.) would continue.	***Action-*** Should cultural resources be identified, adverse impacts will be mitigated by project redesign or abandonment. While operating within the gross project area the DNRC, the purchaser, their contractors, sub-contractors, or employees of any of them identifies a cultural resource operations shall be suspended until further investigation takes place. If necessary, the following will be notified: the County coroner, the DNRC archeologist, State Historic Preservation Office, and the Appropriate Native American tribe. Fire suppression would continue.
AESTHETICS AND VISUALS	The scenic integrity of the project area is currently Moderate, with some areas (such as the old mine tailings at Yreka, and old mining claims within Section 36) would be rated as Unacceptably Low. Generally, the project area has few "distinctive" features. The common "checkerboard" ownership pattern is not present in the Elk Creek drainage.	***No Action-*** No change from existing condition.	***No Action-*** The BLM project would continue, and unnatural straight lines would result along ownership boundaries. These areas would differ in form, line, color, and texture from adjoining DNRC ownership.	***No Action-***
		Action- Some of the treated areas would be visible. Disturbances caused by the construction of roads and the harvest of trees may have an impact on the visual resource. This impact is caused by the contrasts between natural and managed landscapes. These differences are often subjective and are based upon human perception. As slash cures, it changes to a reddish brown that contrasts sharply to the natural setting. This is generally a short-term impact. Due to the varying topography, much of the treated would remain "hidden" to the casual observer.	***Action-*** As the BLM and proposed DNRC projects would modify the vegetation in a similar manner, the effects of harvesting are lessened.	***Action-*** All proposed roads and harvest units were designed to take advantage of the landforms. Silvicultural prescriptions were designed to reproduce line, color, texture and shapes found in the area.

CHAPTER 3

AFFECTED ENVIRONMENT

CHAPTER III
AFFECTED ENVIRONMENT

INTRODUCTION

Chapter III describes the affected environment in terms of issues and concerns, and is organized by resource and affected issues. This description of the affected environment can be used as a baseline to compare the effects of alternatives described in Chapter IV.

I. Existing Conditions

A. General Description of the Project Area-

The land base within the project area is within 2.5 miles northeast of Garnet Ghost Town, and approximately 15 air miles east, southeast of Potomac, Montana. The project area also lies in close proximity to the Wales Creek Wilderness Study Area (Bureau of Land Management), which is located within 3 air miles to the east. The term "project area" refers to each DNRC parcel where activity associated with the proposed action would occur. The term project area does not necessarily indicate that harvest treatments would occur across all portions of State Trust Land listed.

The parcels where management activities would occur under this proposal are limited to section 36 of T13N R14W, and adjoining portions of BLM ownership (for road building) in section 31 T13N R13W. The combined area equals approximately **228** acres. Hereafter, their section numbers will refer to these parcels in the text only (e.g. section 36, section 31 etc.).

Aspects on this sale area vary greatly due to the brokenness of the ground. Slopes range from 0-60% with gentle to moderate topography being the normal. The steepest slopes are found on the south and west side of the ridge forming the proposed middle harvest unit, and the upper portions of the proposed southern unit. Elevations within the project area range from 4,700 to 5,400 feet. Characteristic weather patterns generally originate from the Pacific Ocean, and air masses move from west to east.

Wildlife

The DNRC ownership involved in this project provides a wide range of habitats for a diversity of wildlife species. Habitats range from aquatic, and rich riparian habitats, to drier forested uplands and interior forest types. The predominant wildlife habitat value is winter range for white-tailed deer and elk. These habitats are also representative of relatively broad temperature, moisture, and elevational gradients.

For wildlife-related issues, the "project area" is section 36, T13N R14W. The "analysis area" for cumulative effects follows ridgelines from Elevation Mountain south to Mountain Mine, west to Mountain View Mine, north along the ridge upslope from Stinkwater Creek, and east along the ridge upslope from Cap Wallace Gulch (Figure 3-1). This includes portions of the following sections: T13N R13W, sections 7, 16-21, 28-33; T12N R13W, sections 5-8; T13N R14W, sections 8-30, 32-36; T12N R14W sections 1-3, 11-12.

Human Uses

Human uses are also important aspects of the general area. The project area has high recreational value for activities such as- mining in Elk Creek, hunting, hiking, snowmobile riding, and berry picking. Portions of the project area are visible from Elk Creek County Road and the Garnet Range Road.

II. Cumulative Impacts of Past Management Activities

Timber harvesting was common historically in the area, and continues to be the dominant industry locally. Portions of the project area have been treated in the past (1946, 1948-52, 1954, and 1957). The project area is typical of state-owned lands administered by the Clearwater Unit. Although there are other portions of DNRC ownership within the Elk Creek drainage, much of it is scattered full or partial sections. The drainage as a whole is mainly comprised of three main owners; the BLM, Lubrecht Experimental Forest, and the Montana DNRC. Areas of the drainage were logged heavily during the first part of the 20th century. Portions of the project area have been treated in the past. Treatments within the project area were primarily selection harvests. According to Clearwater Unit section records, approximately 3.066 MMBF was removed between the years of 1946 and 1966. Not all of this recorded volume came from within the proposed project area. Typical logging practices of this time targeted the largest trees, and often the seral species. As a result, the area historically covered by large seral species (Ponderosa pine and western larch) was much greater than the area covered today. Currently, a large portion of the drainage is dominated by lodgepole pine and Douglas-fir with a mix of seral species scattered between the Douglas-fir and lodgepole. This has created a type that is termed a fine scale mosaic. Simply put, the variations within a stand are barely discernable. The stands also cover a large area. Historically, it was unnatural in this drainage to have such large areas (patches) without variability. These large adjoining patches formed a coarse scale mosaic (the ability to easily discern one stand from another). This historical diversity was important in that it made it unlikely the entire drainage would burn in one single large fire. The current conditions have set the stage for the large fire scenario.

Gold mining has also shaped the area. At one time the ghost towns of Coloma and Garnet were thriving communities fed by the mining industry. Much of the mainstem of Elk Creek has been dredged several times. The large piles of debris found at Yreka Flats and along each bank of Elk Creek serve testimony to the mining days on Elk Creek. Many of the main lodes of ore were found in the drainages to the south and west of Elk Creek. Gulches such as Day Gulch and McManus Gulch (within section 36) were also mined very heavily. In some cases, “quicksilver” (mercury) was used to separate the gold from the overburden. As much of the mining occurred prior to the stricter mining rehabilitation laws, they were simply left to revegetate without recountouring. Along stretches of Elk Creek and some tributaries, you can still find flumes made of intricate “rock work”. These were built by primarily Chinese laborers and were used to concentrate water flow for the placer mining process.

Although the DNRC has not harvested timber from the area recently, there has been some harvest activity within the drainage. The most notable recent harvest was done by the BLM in the mid to late 1980’s in the Skimmerhorn drainage. These units were primarily western larch seed tree units. They were broadcast burned and are currently regenerating. These were primarily small units ranging in size from 20 to 60 acres in size. Due to this past harvest and other uses, a road system was put into place. The area to the north of the project area is primarily unroaded.

The main Elk Creek County Road is located adjacent to Elk Creek along much of its route through the canyon. This was originally a wagon road, later a railroad, and over time it has become a main travel route. Unfortunately, it is poorly located and on poor material. Each spring, large amounts of sediment find their way into the stream. It is planned that Missoula County will do major repairs to a segment below Yreka Flats in the near future. The large amount of sediment from this road is a main reason that his stream is listed as a 303d impaired watershed.

III Existing Environment for Issues that Drove Alternative Development

A. EXISTING ENVIRONMENT Overstory cover and movement corridors-

Project Area

Although the project area has been extensively harvested, considerable overstory cover still occurs there. Old skid trails are evident, but most have healed so that they are not passable with vehicles currently. Therefore, the section is relatively inaccessible, except for the main Elk Creek Road that lies diagonally (northwest to southeast) through the section. Potential movement corridors occur along ridgetops that lie northwest and northeast in the northern half of the section, and near the southeast corner.

Analysis Area

The analysis area has been extensively and heavily harvested in the past. Some partial cut areas have trees that provide overstory cover, while clearcut units do not. Elk Creek itself does not provide an overstory cover movement corridor, because an open road lies adjacent to most of the creek's entire length through the analysis area. The upper reaches of both Kennedy (Section 30 T13N/R13W) and Keno (Section 31 and 32, T13N/R13W) Creeks have past clearcut units that have hiding cover, but little overstory movement corridor. Fairly contiguous overstory cover does occur in lower Kennedy Creek in Section 25 (T13N/R14W), in Section 19 (T13N/R13W) and most of Section 35. However, these patches are disjunct from each other. One area that provides a potential corridor is in Sections 13-15 (13N/R14W) along north-facing slopes of the North Fork of Elk Creek. Another area that provides some connected overstory cover occurs from Section 29 southwest along a ridgetop through Section 31 west to Section 36.

B. EXISTING ENVIRONMENT Old Growth-

Project Area

Currently, the project area does not have any stands that meet the current DNRC definition of old growth. The DNRC has adopted the old growth definition developed by Green et. al. (1992). Under this definition, a stand must meet an age requirement, and have a certain number of trees of a given diameter or greater per acre. These minimums are established given the habitat type of the stand. There are two stands that met the old DNRC definition of old growth within the section, but neither stand is to be harvested.

Most of the section—590.8 acres, 95%—is WL/DF appropriate type (Table 3.1). Of that, 545.9 acres are 100-149 years. Some of the WL/DF appropriate is currently WL/DF cover type (215.5 acres, Table 3.1). However, most of the WL/DF appropriate is currently in other cover types (366.8, Table 3.1). Therefore, to recruit WL/DF old growth in Section 36, both time and disturbance would be required. That is, time would be needed to increase the age of dominant trees to 150 years. Disturbance (fire or logging) would be required to convert these acres into WL/DF cover type, generally by removing Douglas-fir, spruce, lodgepole pine, or subalpine fir. For this proposal, approximately 213 acres that are appropriate WL/DF type and at least 100 years old would be potentially harvested (Table 3.1). Of these, 160 acres are at least 100 years old and could potentially be converted into WL/DF cover type by harvest. If converted to WL/DF cover type, these acres could provide the raw materials to potentially age into old growth WL/DF type.

Average diameters in the project area range from 12-16 inches dbh (SLI data). Only scattered yellow pine (large ponderosa pine with yellow bark) is present. The current DNRC old growth definition for WL/DF types (Green et al. 1992), calls for at least 10 trees per acre, average, at least 21 inches dbh and stands at least 150 years old. Currently, there are less than 10 trees per acre, average, this size. Although small patches (less than 5 acres in size) may occur throughout the section with this number and size of tree, the stands do not meet this standard currently. However, with time and cool underburning or "thinning from below", the section could attain this structure in the future.

Table 3.1 Status of Appropriate[1] WL/DF Type (590.8 acres total) in Section 36

AGE	100-149 years 545.9 ACRES		PROPOSED FOR HARVEST	150+ years 36.4 ACRES		PROPOSED FOR HARVEST
CURRENT COVER TYPE	WL/DF	193.3	53	WL/DF	22.2	0
	ALP OR MC	352.6	160[2]	ALP	14.2	0

[1]. See Appendix A for definitions of appropriate cover types.

[2] An additional 8 acres of current LPP and appropriate WL/DF will be harvested that is only 40-99 years old now, and not included in the above chart.

Most of the project area has been harvested previously and has few snags and downed material, especially large-sized western larch and ponderosa pine. Medium-sized western larch or ponderosa pine could provide the raw materials to grow into large-sized trees and with time, into large-sized snags.

Analysis Area

In the analysis area, past harvest and fire suppression have resulted in few old growth attributes (e.g., the number of large-sized western larch and ponderosa pine trees, snags, and downed logs), and the total acreage of old growth habitat (BLM 1999). These attributes are higher in old growth stands than in the existing stands. Therefore, the current BLM Elk Creek timber sale was proposed to thin around large western larch and ponderosa pine trees, to promote old growth characteristics and reduce the risk of stand replacing fire (BLM 1999). Portions of sections 30, 31 (T13N R13W) and 25 (T13N R14W) would be burned with a non-lethal fire in that proposal. The target for large tree (18-24 inches d.b.h.) retention would be 5-10 trees per acre in that proposal. Therefore, although old growth is limited in the analysis area now, up to **300**-acres could approach old growth definition within the next 50 years with the BLM's proposed harvest (BLM 1999). Some of these potential old growth stands are adjacent to the DNRC Elk 36 proposal.

C. EXISTING ENVIRONMENT Snags and coarse woody debris-

Project Area

Most of the project area has been harvested and has few snags, especially large-sized western larch and ponderosa pine. Medium-sized western larch or ponderosa pine could provide the raw materials to grow into large-sized trees and with time, into large-sized snags.

Analysis Area

Due to past harvest, most of the analysis area has few snags, especially large-sized western larch and ponderosa pine. In addition, the open road density and close proximity to Missoula contribute to firewood cutting, which further decreases snags and snag-recruits.

D. EXISTING ENVIRONMENT Road-building-

Project Area

In the project area, old roads and skid trails are evident. Currently, only the main Elk Creek Road and the Keno-Kennedy Road are drivable. The Keno Creek road is walkable.

Analysis Area

The analysis area is highly roaded. See the hydrology section of Chapter 3, this document for a description of past road-building in the analysis area.

E. EXISTING ENVIRONMENT Big Game Considerations-

Project Area

Although the area is used by white-tailed deer and elk, the recent studies involving big game in the area have centered upon moose. The bulk of recent moose radio locations (M. Burcham, pers. comm., research biologist, July 1999) lie just north of the project area. However, moose yearlong home ranges do include portions of Section 36. Habitats used by moose include riparian bottoms and aspen sites. Important areas occur in the northeast corner of Section 36, and along Keno Creek.

Analysis Area

The analysis area provides habitat for white-tailed deer, elk, mule deer, and moose. The analysis area is part of a moose telemetry study that has been ongoing since 1998 (M. Burcham, pers. comm., research biologist, July 1999). Radio telemetry data indicate that moose spend much of their time in narrow riparian bottomland habitats, especially during winter. Riparian areas contain thick cover, in particular spruce trees that are important for snow interception. Key forage appears to be red ozier dogwood (*Cornus stolonifera*), which also occurs in riparian habitats. Kennedy and Keno Creeks in particular provide important yearlong moose habitat.

Although elk use the analysis area, telemetry data indicated that it is not a key security area. In general, forested cover habitat patches are small and road density relative to cover patches is high (Milo Burcham, pers. comm., research biologist, July 1999). These conditions contribute to low habitat suitability for elk. Scattered summer use is evident, especially at the higher elevations in the analysis area. Most elk have left the area by hunting season, however.

F. EXISTING ENVIRONMENT Geology & Soils-

The Elk Creek project area is located on moderate to steep slopes with soils weathering from mainly granitics. The granitics consist mainly of micaceous granodiorites, which are extremely weak and brittle when weathered and break down into coarse sands that are easily eroded.

There are no especially unique or unusual geologic features in the sale area, except for some mineralized zones that were placer mined. Small areas of slope instability were noted in the general project area of the Elk Creek drainage, but do not occur within proposed harvest units. Granite outcrops are common in the project area. Bedrock in the project area should be rippable where encountered at shallow depth, with the exception of some boulders exposed on ridges and midslopes, which can hinder road and skid trail location. See **Appendix A map 3.2** *Inoperable Ground and Difficult Features Within the Proposed Elk 36 Timber Sale.* Limestone occurs in the SW corner of the section, but no activities are currently planned in this area. No suitable gravel sources were noted in the sale area. Where gravel is needed it, should be supplied by the contractor from a suitable source.

SOILS

Soils information was adapted from the Missoula County Soil Survey and verified in the field. See **Appendix A map 3.3** *Soils Map for the Proposed Elk 36 Timber Sale.* Predominant soils are Ambrant-Rochester complexes on dissected mountain sideslopes of 30 to 60% and ridges. These soils are shallow to moderate depth, gravelly sandy loams weathering from granitics. Topsoils are 0-4 inch gravelly sandy loams over moderately deep gravelly coarse sands. These soils are excessively well drained and become droughty in the summer. Open southerly aspects can lead to high plant mortality and difficulty to revegetate cutslopes. Erosion hazard is high on bare granitic soils and increases with slope. Compaction hazard is low and less of a concern than rutting when soils are wet. These soils have a long season of use. Primary concern for soil productivity is maintaining the shallow topsoils, by minimizing displacement, controlling erosion and retaining a portion of woody debris for long term nutrient cycling.

On more complex terrain of dissected mountain sideslopes, there are numerous small, incised draws separated by broader convex ridges. Soils are shallow on the ridges (Ambrant) and deeper in the draws (Rochester), supporting more productive timber stands. The complex terrain and rock limits suitable sites for skid trail locations. Old skid trails that were located down draws on many sites have mostly revegetated, but some sites have erosion problems. The complex terrain requires skid trail planning for most efficient skidding to limit area of disturbance and avoid old poorly located trails.

Abrupt, steep 40-60% slopes occur along portions of Elk Creek and the Kennedy Creek tributary. The Ambrant and Rochester soils (map units 2 & 3) occur mainly on dry south aspects with shallow soils supporting Ponderosa Pine and Douglas fir. The Ovando-Elkner soils (map units 35 and 74) are mainly on north aspects with deeper more productive soils supporting Ponderosa Pine, Douglas Fir, and Alpine Fir. Both map units have high erosion risk that require cable harvest or winch line skidding to existing roads.

Narrow alluvial deposits within map unit 6 (aquolls), occur adjacent to the Elk Creek. These alluvial deposits are seasonally wet supporting willow and some spruce. The complex terrain and narrow nature of some wet areas are not possible to map at this scale and require site specific review for design of mitigation measures.

Soil bearing strength is low which can make roads impassable to 4X4's when wet and difficult to maintain road drainage on native material roads. Turnpiking across flats and spot gravel surfacing may be required in association with season of use limitations.

All SMZ widths would be located based on a high erosion hazard and would often be wider than SMZ widths mandated by the Streamside Protection Act..

G. EXISTING ENVIRONMENT Noxious Weeds-

Noxious weeds, mainly knapweed (*Centaurea maculosa*) and spots of thistle (*Cirsium arvense*) occur within the project area, mainly along the lower portion of the Elk Creek road. Knapweed occurs as spot infestations on roadside edges within the State section. South slopes are droughty and at higher risk of weed establishment.

H. EXISTING ENVIRONMENT Hydrology-

Watersheds

The proposed timber sale is located in Section 36 T13N R14W. This state owned parcel lies within the Elk Creek watershed. Elk Creek is a fourth order, perennial, Class I tributary to the Blackfoot River. The Elk Creek watershed drains an area of approximately 33,150 acres. Annual precipitation within the drainage varies from about 30 inches per year in the headwaters to approximately 16 inches per year at the lower elevations. Most of the annual precipitation occurs as snowfall with runoff from melting snowpack producing elevated streamflows during the months of April, May and June.

The mainstem of the Elk Creek stream channel flows for approximately 14 miles northwest through the Garnet Mountains before entering the Blackfoot River at river mile 28. The lower portions of the Elk Creek watershed can be characterized as broad alluvial floodplain adjoined by rolling foothills. This area is dominated by grassland, shrub lands and relatively dry forest habitat types (ponderosa pine and Douglas fir). The upper portions of the watershed are located on steeper mountain slopes that are dissected by several tributary headwater streams. This portion of the watershed is comprised of three distinct geologic types and is vegetated primarily by coniferous forest. These geologic types include limestone, granodiorite and pre-cambrian belt super group (quartzite, argillites and siltites).

While the mainstem of Elk Creek does flows through State section, the proposed harvest units are not located within the immediate vicinity of the mainstem Elk Creek. The proposed harvest areas are located moderate mountain slopes east of Elk Creek and the main county road. Most of proposed sale area lies within the Kennedy Creek and Keno Creek drainages. Both of these drainages are tributary to Elk Creek.

Kennedy Creek is a third order, perennial, Class I tributary to Elk Creek, which drains a watershed area of approximately 2758 acres. Most of the proposed harvest area in the Kennedy Creek watershed is actually located in the drainage area of an unnamed, second order, perennial, Class I tributary to Kennedy Creek. Stream flows from this tributary are continuous with direct surface discharge into Kennedy Creek. The confluence of this tributary with the mainstem Kennedy Creek is located immediately downstream of the proposed harvest area. The unnamed tributary also has an intermittent fork that contains a short reach of Class II stream channel (see watershed map A 3.4). The remaining portion of this harvest area is drained by several ephemeral draws and swales, which are located upslope of the main Elk Creek valley bottom. These draw features do not contain discernable stream channels and do not have direct delivery of concentrated surface runoff to Elk Creek.

That portion of the proposed harvest area that is located in the southwest 1/4 of the State section lies primarily within the Keno Creek watershed. Keno Creek is a second order, perennial, Class I stream that drains a watershed area of approximately 1557acres. The proposed harvest area contains a large draw feature with a short reach of perennial, but discontinuous, Class II stream channel and a short reach of intermittent, Class III stream channel (see watershed map A 3.4). This portion of the proposed harvest area also contains several ephemeral draws and swale features that are located on a slope situated above the main Elk Creek valley bottom. These features do not contain discernable stream channels and do not have direct or concentrated surface delivery to Elk Creek.

The existing BLM Garnet Range Road and a short segment of the existing Elk Creek County

Road provide Road access to the proposed project area. The Garnet Range Road system is located primarily in the Elk Creek watershed, but also contains short segments that are located in the Washoe Creek and Union Creek watersheds. The segment of the Missoula County road planned for use in this proposal is located entirely within the Elk Creek watershed.

That portion of the Garnet Range Road located in the Union Creek drainage (Section 14 T13N R15W) was analyzed under the DNRC West Lubrecht Timber Sale EA. This segment of the Garnet Range Road is located in a landscape that is drained by several ephemeral swales and draws. One of these draws contains a short discontinuous reach of stream channel that is feed by a small perennial spring/wetland complex. Flows from this drainage feature eventually flow subsurface before reaching any perennial or continuous tributaries to Union Creek. The main drainage feature further down slope of this area is an unnamed fork of Union Creek. This drainage feature has been greatly influenced by the location and construction of Highway 200. Large portions of the main draw bottom were completely filled for the highway and no stream channel features are now apparent. All runoff and surface drainage from this area has been cutoff from natural drainage patterns by the highway fill.

Washoe Creek is a perennial, Class I tributary to Union Creek. That portion of the Garnet Range Road lying within the Washoe Creek watershed is located on the ridge top dividing Washoe Creek from Elk Creek. It is located on gentle slopes and does not contain any stream or ephemeral drainage feature crossings.

Regulatory Framework

This portion of the Blackfoot River basin, including Elk Creek, Kennedy Creek, Keno Creek, Union Creek and Washoe Creek are classified B-1 in the Montana Surface Water Quality Standards. The B-1 classification is for multiple use waters suitable for domestic use after conventional treatment, growth and propagation of cold-water fisheries, associated aquatic life and wildlife, and agricultural and industrial uses. Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentration of sediment, which will harm or prove detrimental to fish or wildlife. Naturally occurring includes conditions or materials present from runoff on developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices through its Nonpoint Source Management Plan as the principle means of controlling nonpoint source pollution from silvicultural activities.

Elk Creek and Union Creek have been identified as water quality limited water bodies in the 2000 update to Montana's 303(d) list. The 303(d) list was compiled by the Montana Department of Environmental Quality as required by Section 303(d) of the Federal Clean Water Act and the EPA Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, the State is required to identify water bodies that do not fully meet water quality standards, or where beneficial uses are threatened and/or not supported. Such streams or lakes are referred to as "water quality limited". Federal laws also require that those waterbodies listed to be targeted for Total Maximum Daily Load (TMDL) development. The TMDL process is used to determine the total allowable amount of pollutants in a waterbody or watershed. Each contributing source is allocated a portion of the allowable limit. These allocations are designed to achieve water quality standards. Montana's 2000 list was recently finalized and approved by EPA.

Sections 75-5-701 through 75-5-705 of the Montana Water Quality Act also direct the Montana Department of Environmental Quality (DEQ) to assess the quality of state waters, insure that sufficient credible data exist to support listing with a threatened or impaired status, and to develop TMDL's for those waters identified as threatened or impaired. Under Montana Law, new or expanded nonpoint source activities affecting a listed water body may commence and continue provided they are conducted in accordance with reasonable land, soil and water conservation practices.

Elk Creek was included on the Year 2000 303(d) list because the cold-water fishery and aquatic life support beneficial uses were determined to be only partial supported. Partially supported is defined as: Beneficial uses that are not being supported at natural or best practical levels. This is a broad designation, used in situations in which water bodies are slightly impaired to situations in which a water body is very nearly not supporting a designated use. The probable causes of impairment in upper reaches of Elk Creek have been identified as cadmium, nitrate, siltation and other habitat alterations. The probable sources of impairment in upper Elk Creek are identified as logging road construction / maintenance, erosion and sedimentation and placer mining. The probable causes of impairment in the lower reaches of Elk Creek have been identified as siltation, thermal modifications and other habitat alterations. The probable sources of impairment in lower Elk Creek are identified as range grazing – riparian, and erosion and sedimentation.

Union Creek was included on the 303(d) list because the cold-water fishery and aquatic life support beneficial uses were determined to be non-supporting. The "non-supporting" status is used when biological or physical data indicate severe degradation, or where other data indicate that water quality standards are violated and one or more uses cannot be attained. The probable causes of impairment in Union Creek have been identified as flow alteration, other habitat alterations, siltation, and thermal modification. The probable sources of impairment in Union Creek are identified as agriculture, highway/road/bridge construction, irrigated crop production, natural sources, rangeland, and stream bank modification/destabilization.

DEQ recently completed a technical review of the 1998 version of the 303(d) list. During this review, DEQ determined that there is insufficient credible data to support 303(d) listing of both Keno Creek and Washoe Creek. Therefore, both streams have been removed from the State's Year 2000 303(d) list. Kennedy Creek has not been designated as a "water quality limited" waterbody on the 2000 303(d) list.

Cumulative Watershed Effects - Existing conditions

Mining, road building, agriculture, grazing, timber harvest and fire suppression have occurred in the Elk Creek watershed over the past 125 years. Extensive placer mining has altered approximately 9 miles of mainstem Elk Creek stream channel and 8 miles of the tributary stream channel. Roads directly tied to mining have also channelized approximately 4 miles of stream channel. Approximately 9508 acres of timber harvest have occurred in the past 30 years.

Extensive grazing activity on private land in the lower part of the watershed has impacted approximately 5 miles of the main stem Elk Creek. Stream diversions in the lower watershed have also contributed to cumulative watershed impacts. One mile of stream channel was diverted from its original location for irrigation purposes during the 1940's. The channel was diverted from its alluvial floodplain to an upland area located in glacial-lacustrian deposits. This resulted in stream down-cutting and vertical channel incision of up to 10 feet. The amount of in channel sediment produced by the steep, highly erodible banks in this reach are as much as 900 % greater than that produced upstream in the forested watershed (MDFWP 1997).

In 1994, about 8,000 feet of this segment of Elk Creek was reconstructed in a cooperative project involving the private landowner, Trout Unlimited and the MDFWP. Evaluation of the success of this project is being monitored by MDFWP. Results to date have not been published.

Also in 1994, approximately 4,700 feet of placer mined stream channel was restored by the BLM in the upper reaches of the mainstem Elk Creek. Following channel reconstruction, a monitoring program was developed to assess recovery of the riparian and aquatic systems over time. Data collected since that time indicated that channel stability, water quality and macroinvertbrate bio-indicators have improved.

A detailed watershed analysis was completed for the entire Elk Creek drainage and each of the affected tributary watersheds previously described. The analysis was completed to determine the existing watershed conditions and the potential for additional cumulative watershed impacts. DNRC, BLM, the University of Montana School of Forestry's Forest and Conservation Experiment Station, and Lubrecht Experimental Forest jointly completed the analysis. The analysis included field reviews conducted to: 1) Inventory stream channel condition and stability, 2) Assess fish habitat and riparian conditions, 3) Determine existing road conditions, and 4) Identify potential source of sediment.

A detailed analysis of Washoe Creek and Union Creek was not completed because the DNRC proposal only includes use of an existing high standard and gravel surfaced segment of the Garnet Range road in these watersheds. This segment of road is located high on top of the ridge dividing Washoe Creek, Union Creek and Elk Creek. The road is located on gentle slopes in areas with no direct surface delivery to streams or continuous ephemeral drainage features. These road segments were evaluated and found to be in good condition, conform with minimum BMP standards, and determined to be low risk to water quality and cumulative watershed impacts. These drainage areas were included in the analysis completed for DNRC's West Lubrecht Timber Sale EA.

Water Yield Analysis

The cumulative watershed effects analysis also included computer modeling of average annual water yield under natural conditions and estimates of changes in average annual water yield due to fire suppression, existing roads and timber harvest in the all affected tributaries. These calculations were completed using the MAGIS computer model. MAGIS is a spatial decision support model used for planning land management activities and transportation systems on a geographic and temporal basis. The MAGIS model incorporates the Equivalent Clearcut Area (ECA) method as outlined in Forest Hydrology Part II, USFS Region 1, 1974 to analyze effects of timber harvest and road construction on runoff and water yields. Historic water yields were determined by methods based on the publication Hydrology of Mountain Watersheds, USDA-SCS, 1971. Harvest history and road information were compiled using information obtained from BLM harvest records, Lubrecht Forest stand inventory, DNRC harvest records, DNRC Hazard Reduction Records, and BLM aerial photos. The results of that analysis are summarized in the following table:

Table 3.2 - Modeled Water Yield Increases

Watershed	Watershed Area (Acres)	Existing Harvest (Acres)	Existing Roads (Miles)	Existing ECA (Acres)	% W.S. Area in ECA	% Water Yield Increase
Elk Creek	51,881	9508	164.5	4346	8.5	4 %
Kennedy Creek	2758	817	9.8	326	11.8	2 %
Keno Creek	1557	1048	15.9	514	33.0	5 %

Equivalent Clearcut Area (ECA) is calculated as a function of area (acres) treated, % of forest crown removed and estimates on the amount of hydrologic recovery due to vegetative re-growth. Recovery values were verified and adjusted by observations made in the field. The figures reported for Elk Creek are totals for the entire Elk Creek basin. They include the figures reported separately for the tributary analysis areas Kennedy Creek and Keno Creek

Results of the MAGIS modeling indicate that estimated levels of existing water yield increase (WYI) due to management activities in Elk Creek, Kennedy Creek and Keno Creek are relatively low. The predicted WYI are well below those levels normally associated with detrimental impacts to stream channel stability and fisheries habitat. In fact, the existing levels of WYI are similar to those predicted to result under natural conditions based on expected historic vegetation and modeling of mixed severity and stand replacement fire regimes.

Table 3.3 - Model Water Yield Increase from Wildfire

Watershed	% WYI From Existing Harvest and Roads	% WYI Mixed Severity Fire	% WYI Stand Replacement Fire
Elk Creek	4 %	4 %	4 %
Kennedy Creek	2 %	3 %	6 %
Keno Creek	5 %	5 %	4 %

Stream Channel and Riparian Conditions

All stream channels and ephemeral drainage features within the proposed harvest area were evaluated and inventoried using the Rosgen channel morphology classification system (Rosgen 1995) and the Pfankuch channel stability method (USDA-Forest Service, 1975).

The mainstem of Elk Creek within the proposed timber sale area has been extensively placer mined in the past. Channel form and function has been greatly altered by the intensive level of disturbance. The extensive reclamation work completed on the state section has largely stabilized the mined area, but has not restored natural channel form or function.

Four different stream reaches were delineated and evaluated on the unnamed tributary to Kennedy Creek within the State section. These stream reaches were classified as B2, B3, and B4 Rosgen channel types. Channel stability ratings ranged from “fair” to “good” conditions depending on the location. All four reaches contain relatively stable streambanks which are well vegetated with riparian shrubs.

The mainstem of Kennedy Creek was evaluated between the confluence of the unnamed tributary draining the State proposed harvest area and the mainstem Elk Creek. This reach is a B5 Rosgen channel type with “fair” channel stability. The fair rating is primarily due to channel scour and high degree of fine sediment deposition. Riparian conditions were found to be in good condition with a stable and healthy spruce dogwood riparian community dominating the reach.

Channel conditions in Keno Creek were found to be in “good” condition within and immediately downstream of the proposed harvest area. The stream banks are well vegetated with trees or deeply rooted riparian shrub species.

Water Quality

Many of the streams in the affected environment have been impacted by accelerated rates of sedimentation. Historic and recent mining, the existing road system and current gazing management practices have contributed to these impacts. Monitoring data collected by the BLM shows that water quality in Keno Creek and Upper Elk Creek (above Keno Creek) is high in regards to suspended solids. The BLM has used turbidity measurements as a surrogate for suspended solids concentration. Based on turbidity data collect to date, conditions in both Keno Creek and Upper Elk Creek are considered to be a close approximation of historic levels (BLM 1999). In this context, data collected from Lower Elk Creek and Kennedy Creek indicates that water quality in these streams is impaired. Water quality impacts in both these drainages are largely attributed to road related delivery of sediment. On the state land proposed for harvest, there is not a grazing license currently.

BLM and DNRC hydrologist and soil scientist inventoried existing roads in the Elk Creek watershed. Several segments of the Missoula County road system located in the lower and middle portions of the Elk Creek drainage were identified as a principle source of sediment delivery to Elk Creek. These road segments are in extremely poor condition and do not comply with Best Management Practices (BMPs). Several reaches of this road are located immediately adjacent to the mainstem Elk Creek channel and direct delivery of sediment is occurring. These segments of County Road are located on private, state, BLM and Lubrecht Forest ownership. The County Road system also contains sustained steep grades, lacks adequate surface drainage features, contains over steepened cut slopes, and lacks general road maintenance.

The State's section 36 and the adjacent State ownership in section 35 T13N R14W contain a segment of the Skimmerhorn road. This old mining road contains steep sustained grades and is poorly located along and within a stream bottom. The road intercepts an intermittent stream channel in several locations on State land that has resulted in severe road surface erosion, gullying and subsequent sediment delivery to the stream. The stream affected is an unnamed, perennial and discontinuous tributary to Elk Creek. Despite the high levels of chronic sediment delivery occurring at this site, there is no sediment delivery to Elk Creek occurring. Stream discharge from this tributary goes subsurface as the stream flows out across old pacer mine tailings before reaching Elk Creek.

The erosion problems identified on both of these existing road systems will continue to pose chronic sources of potential sediment delivery to streams and impact to downstream water quality unless improvements, mitigation and remedial action measures are implemented.

The DNRC proposal does not include use of the identified problem segments of County road nor the Skimmerhorn Road. Some erosion control features would be installed on the Skimmerhorn Road as part off this proposed timber sale. The primary access route to the proposed DNRC harvest area is provided by the existing BLM Garnet Range Road, Keno Creek Road and a short segment of County road in located in the Upper Elk Creek drainage. The Garnet Range Road is a high standard, all weather road with high traffic use. The Keno Creek road is a high standard road that contains several minor BMP departures and maintenance needs. The proposed use of Country Road is located between Keno Creek and the intersection with the Garnet Range Road. All of these road segments have been evaluated and determined to have a low risk of contributing to water quality impacts.

I. EXISTING ENVIRONMENT Fire History and Ecology-

Historic fire-caused disturbance was the primary factor in the development of pre-settlement forest within the Elk Creek drainage. Much of the area developed under stand replacement fire regime (the fire would consume the understory and overstory of a given forest stand) or the mixed severity fire regime (some portions of the stand would experience a stand replacement burn, other areas would experience lower fire severity leaving portions of the overstory and understory intact.). Often this was the "rebirth" of the forest stand.

In their 1987 publication, *Fire Ecology of Western Montana Forest Habitat Types INT-223*, William Fischer and Anne Bradley summarized information on fire as an ecological factor for forest habitat groups in western Montana. When used with the Robert Pfister et. al. 1977 publication, *Forest Habitat Types of Montana INT-34*, the individual forest habitat types are assigned to Fire Groups. Information for each Fire Group is presented on the relationships of major tree species to fire, fire effects on undergrowth, forest fuels, the natural role of fire, fire and forest succession, and fire management considerations. A map was produced showing the fire groups located within the proposed Elk 36 Timber Sale and can be found in **Appendix A map 3.5**.

In studying the aerial photography taken of the area (1938 and 1981 flight years) and current flight (1996 flight year), it is obvious that current crown density and distribution is much heavier at the present time. These photographs also show the long history of resource extraction that has occurred within this particular section. DNRC's intent is to apply treatments to this area to reduce the stocking level of the forest and make a shift back to the species that were historically present (such as western larch and ponderosa pine), away from the shade tolerant (such as subalpine fir and Engelmann spruce) and the dominant short lived shade intolerant lodgepole pine

The increase in stocking level is primarily attributed to the loss of fire and its natural role of disturbance within these stands. Much of the area (primarily the south and west facing slopes and the ridge tops) fits within the upper elevation ponderosa pine type as determined through the cooperative basin analysis project. As such, historically, these stands would have subjected to a regime of high-frequency, low- intensity ground fires. Much of the north and east facing slopes would have been dominated by the western larch and Douglas-fir type. These areas would have been subjected to a lower frequency, moderate-intensity fire. Historically, fire behavior in this type within the sale area would have been controlled more by topography than by the forest type and fuel loading. Due to the extremely broken terrain, fires were unable to accomplish large crown fire runs. The high-energy steep slopes are very short lived. These two types of fire regimes served several functions within the respective stand types illustrated in Table 3.4:

Table 3.4

	ponderosa pine type	**Douglas-fir / western larch type**
1	Limited stocking and density by killing smaller trees	Created openings within the stand which enabled natural regeneration (western larch and Douglas-fir) provided for multi-storied stand structure, and limited the establishment of lodgepole pine
2	Maintained low fuel loadings within stands which prevented the occurrence of high-intensity fires which could injure or kill large trees within stands.	Maintained lower fuel loadings and developed a fire mosaic as one area may have experienced a light underburn, while an adjacent area would have undergone a stand replacement event. These areas may well have "switched" fire behavior during the next fire event.
3	Prevented the encroachment of shade tolerant species (most notably Douglas-fir) into stands of shade intolerant dry site species.	Prevented the encroachment of shade tolerant species (most notably subalpine fir) into stands of shade intolerant western larch and shade tolerant Douglas-fir.

As fire suppression has altered the composition of the stands within the Elk 36 project area, several problems have become evident. The first, and perhaps most detrimental, is the intrusion of significant amounts of Douglas-fir into stands which historically were predominantly ponderosa pine, with a small percentage of other species. As Douglas-fir has encroached into these stands, the survival of older, larger trees has been threatened by inter-tree competition for sunlight, water and nutrients, and the extremely dense stands of seedling and sapling sized Douglas-fir that have created a build-up of "ladder" fuels within these stands. These "ladder" fuels are a particular threat to existing stands in that they create conditions which allow ground fires to get into the crowns of overstory trees producing a crown fire situation. It is reasonable to assume that dry site ponderosa pine and Douglas-fir sites within the project area, under their historic fire regime, were rarely subjected to crown fires, thus, the conditions which occur on these sites today make these stands susceptible to a stand-replacement fire event, an occurrence that they were rarely subjected to historically.

In addition, as Douglas-fir is more shade tolerant than ponderosa pine, it is able to continue to successfully regenerate as the canopy closes, preventing the regeneration of ponderosa pine which requires much more sunlight. As this cycle continues, i.e. the loss of large, old ponderosa pine in the overstory and the lack of pine regeneration, the percentage of ponderosa pine within these stands decreases.

The project area, as with much of the intermountain west, has been logged in the past. According to DNRC records, there were timber sales in this section in 1946, 1948-1952, 1954, and 1957. As was the common practice during these times, larger members of the seral species such as ponderosa pine and western larch were often removed. By removing these larger trees, the species shift attributed to fire suppression has been exacerbated.

J. EXISTING ENVIRONMENT Existing Vegetation and Growth and Vigor of Trees-

The project area is currently dominated by small lodgepole pine and Douglas-fir. Much of this is regeneration from trees left after the last harvests during the 1940's and 1950's. There are still large Ponderosa pine, western larch, and Douglas-fir trees remaining, however their number is less than the approximated historical condition. The upland and ridge areas within the project area can generally be categorized as having this condition. A majority of the understory Douglas-fir and lodgepole pine are less than 50 years in age. The average diameter is between 6 and 8 inches at DBH (diameter at 4.5 feet above the ground line). These trees average between 35 and 50 feet in height. The larger overstory trees range in age from 100 to 350 years old. Diameters range between 13 and 36 inches at DBH. The heights range between 60 feet and 110 feet. From a distance, much of the area is "carpeted" with small lodgepole pine, with the occasional large relic western larch, Ponderosa pine, and Douglas-fir emerging above. The dense understory inhibits regeneration of seral western larch and Ponderosa pine. Through the gradual decrease in successful seral regeneration, the species composition has shifted, and will continue to shift, away from the natural historic conditions.

Some large Engelmann Spruce are found along Keno and Kennedy Creeks, and along Elk Creek up stream from the mining claim near the confluence of Keno Creek, Elk Creek, and McManus Gulch. Small Engelmann Spruce and subalpine fir are the primary understory species along these riparian areas. There are several shrub and hardwood trees that also share the riparian areas such as black cottonwood, Sitka mountain ash, red-osier dogwood, alder, and several willow species. These are very important browse species for the big game species in the area, and a source of cover for many of the smaller bird species.

Much of the low shrub community is dominated by huckleberry and dwarf whortleberry. There is also common juniper and buffalo berry scattered throughout the project area. The forb and grass species are dominated by pine grass and beargrass. There are some noxious weeds (primarily knapweed and thistle) present within the project area, located generally along existing roads and adjacent to roads within old mining claims.

As mentioned previously, stands in the project area are overstocked as compared to historical averages. This overstocking not only changes the fire regime, it also stresses trees due to the lack of vital resources (water, nutrients, and light). As these resources become limited, inter-tree competition for the limited resources takes place. Trees will decrease growth and their vigor will decrease as competition increases. As vigor decreases they become more susceptible to various insect and disease agents.

The crowded stand conditions within the project area if left untreated will eventually contribute to conditions which favor an infestation of Mountain Pine Beetle (MPB) (*Dendroctonus ponderosae)* in the ponderosa pine and lodgepole pine overstory. The aforementioned conditions are primarily lowered vigor due to increased inter-tree competition and the existence of the cool, dark stand conditions favored by the beetle. DNRC hopes that by alleviating these unfavorable conditions within existing stands, and emulating stand conditions that existed prior to organized fire suppression, forest health within the project area would be improved, and biologically sustainable conditions would be created.

A planting project within the mining claim located in Elk Creek near the confluence of Keno Creek began in the spring of 2001. The DNRC will plant 250 Drummond Willow and 250 Sandbar Willow along the banks of Elk Creek. The intent is to provide shade for the stream, decrease the spread of noxious weeds, and to provide the building blocks to eventually let this stream segment return to a condition closer to pre settlement conditions. Further rehabilitation measures are planned in the future, including further planting.

K. EXISTING ENVIRONMENT Economics, Benefits, and Expected Project Revenues

As stated in Chapter I, in Section C.1, the DNRC proposes to harvest between .5 MMBF and 1.5 MMBF. This range is due to the undetermined amount of pulp and roundwood volume available within the proposed project area. If this project were implemented, an approximate harvest volume would be determined by "cruising" (sampling the forest stand to determine volume).

For reasons of this economic analysis it is assumed that approximately .75 MMBF of sawlog material would be removed. Current delivered prices of the proposed size classes to be removed range between $300 and $400 per mbf. (Pyramid Mountain Lumber Company, pers. com., August 16, 2001). The pulp and roundwood currently are valued at approximately $28 per ton delivered (Smurfit-Stone, pers. com., August 16, 2001).

Currently there are not any active mining claims, grazing permits, or cabin sites within section 36. Aside from occasional recreational use, there is no economic contribution to the School Trusts from this section at this time.

Proceeds from this proposed action would go to the Public School account of the School Trust.

IV. Existing Environment for Issues That Did Not Drive Alternative Development

A. *EXISTING ENVIRONMENT Endangered, Threatened, and Sensitive Species and other species of interest-*

Bald Eagle (federally-threatened, proposed for de-listing)
Affected Environment
Project and Analysis Areas

Bald eagles could occur both the analysis and project areas. However, the birds typically nest within 1 mile of and forage on large bodies of water, usually greater than 40 acres. Bald eagles winter and nest along the Clark Fork, Clearwater, and Blackfoot Rivers. At the closest, the Clark Fork River is approximately 8 miles from the analysis area. There are no large lakes (or rivers) within 1 mile of the project area. Bald eagles could forage on carrion in the project or analysis areas. To date, no bald eagles have been seen in the proposed project area, and none were recorded within 1 mile (Montana Natural Heritage Program Database, MNHD). However, bald eagles are reported to breed in this latitude / longitude (26B, Montana Bird Distribution database, MBDD mnhp@nris.state.mt.us).

Large-sized ponderosa pine trees are present in the both the project and analysis areas, and this habitat component may be used by bald eagles for roosting and nesting. Roosting areas may be located miles from river and lake foraging areas. In addition, bald eagles could migrate through the project or analysis areas. The two areas do not contain any large lakes or rivers, so potential bald eagle habitat is limited. However, Yreka Flats in the analysis area does have some small potholes and broad flat riparian habitat with adjacent coniferous cover. Bald eagles could potentially use that area. Otherwise, there is little suitable habitat for bald eagles throughout either the project or analysis areas.

Grizzly Bear (federally-threatened)

Affected Environment

Project and Analysis Areas

Grizzly bears could occur in the project or analysis areas. Grizzlies are wide-ranging mammals that use forested upland habitats. Habitats that are particularly attractive to grizzly bears include big game winter range areas, riparian zones, and avalanche chutes. These are areas that provide seasonally-important bear foods, including wet-site forbs in spring and summer, winter-killed carrion in spring, and shrubs in the fall. The project and analysis areas have riparian and winter moose habitat areas that could be attractive to grizzly bears. Open road density in the analysis area is relatively high, which decreases habitat suitability for bears. However, the project area is relatively secure due to low open road density.

Gray Wolf (federally-endangered)

Affected Environment

Project and Analysis Areas

Gray wolves could use the project or analysis areas, although there are no documented dens in either area (Ed Bangs, USFWS, pers. comm.). Wolves are wide-ranging mammals that use forested upland habitats. Wolves are associated with areas that produce prey species, mainly big game and small mammals. The project and analysis areas include an important winter moose range, as well as areas used yearlong (Milo Burcham, USFS research biologist, pers. comm. July 1999). Big game winter range areas are attractive to wolves. Open road density in the analysis area is relatively high, which decreases habitat suitability for wolves. However, the habitat in the project area is relatively secure due to low open road densities.

Sensitive Species

Peregrine Falcon (recently de-listed from federally-threatened)

Affected Environment

Project and Analysis Areas

Peregrine falcons are associated with tall cliffs or waterfowl concentration areas. No cliffs at least 50 m tall occur in the project or analysis areas. To date, no peregrine falcons have been seen in the project area, and none were recorded within 1 mile (MNHD. Peregrine falcons could migrate through the area, although none have been recorded for this latitude / longitude (MBDD). Prairie falcons have been recorded on migration, however.

Western Larch and Ponderosa Pine-Associated Species
Pileated Woodpecker and Flammulated Owl
Affected Environment
Project and Analysis Areas

Pileated woodpeckers have been heard in the project area, and likely occur in the analysis area as well. The birds are associated with stands dominated by mature to old growth ponderosa pine or western larch. The woodpeckers prefer large-sized ponderosa pine and western larch snags and coarse woody debris for feeding, roosting and nesting. Nest trees are usually in snags at least 18 inches d.b.h. Large-sized snags and downed material essential habitat features for pileated woodpecker foraging and nesting are scattered in the project area. Fewer components are in heavily-logged portions of the analysis area. Large trees dominate no stands in the project or analysis area. Currently, pileated woodpeckers are listed as occurring in this latitude / longitude (MBDD).

Flammulated owls occur in mature to old growth ponderosa pine and mixed pine and Douglas-fir stands. The birds nest in cavities, and prefer those excavated by pileated woodpeckers where available. . Nest trees in 2 Oregon studies were 22-28 inches d.b.h. (McCallum 1994). Habitats used have open-to-moderate-canopy closure (30 to 50%) with at least 2 canopy layers, and often are adjacent to small clearings. In addition, stands used often have a shrub understory. An open forest structure with shrubs contributes to producing insects, the main prey of flammulated owls. Potential flammulated owl habitat occurs throughout the project and analysis areas. However, low numbers of snags and coarse woody debris (in both the analysis and project areas) limits habitat suitability. Flammulated owls are not recorded for this latitude / longitude (MBDD).

Species Associated with Spruce and Fir Habitats
Lynx
Affected Environment
Project

Potential lynx denning habitat consists of relatively dense stands (at least 50% canopy closure) of mature to old growth structure at 5,000 feet elevation or higher, in spruce-fir habitats that contain numerous downed logs. Elevations in the project area range from to 4,800 to 5,400 feet elevation, and suitable habitat types (Pfister et al. 1977) for potential denning occur in the area. A bobcat was seen in the project area within the last 5 years (Milo Burcham, USFS research biologist, pers. comm. July 1999). However, stands in the project area are not old growth, are not extremely dense, and have few large downed logs for potential denning habitat. The exception in the project area would be Keno Creek.

Snowshoe hares are important lynx prey that is associated with young dense lodgepole pine stands. Although lodgepole pine occurs in the project area, the stands are not composed of dense 10-20 year old trees. The project area likely supports some snowshoe hares, however.

Analysis Area

Suitable habitat types and elevations are found in the analysis area to provide lynx habitat. However, most of the area has been heavily harvested, so cover is limited. The areas with the most extensive cover are west in Section 35, south in Section 1 (T12N/ R14W), and along the North Fork of Elk Creek, Sections 13, 14, and 24 (T13N/ R 14W). Lodgepole pine stands are scattered throughout the analysis area.

Fisher

Affected Environment

Project and Analysis Areas

High-quality fisher habitat consists of late-successional forests with dense canopies in close proximity to riparian areas. Elevations are usually less than 6,000 feet. Suitable riparian areas in the project area are along Keno Creek. Suitable riparian areas in the analysis area include Kennedy Creek and North Fork Elk Creek. Current low densities of coarse woody debris and large-sized snags in the project and analysis areas limit habitat value to fisher, however.

Boreal Owl

Affected Environment

Project and Analysis Areas

Preferred boreal owl habitat includes spruce and fir habitats from 5,000 to 8,000 feet elevation. The project area is 4,800 to 5,400 feet elevation. Areas that are higher than 5,000 feet are in the southwest and northeast corners of the project area. The southwest corner is composed of suitably-moist true fir habitat types (Pfister et al. 1977). However, the southwest corner is not proposed for harvest. The northeast corner is composed of more dry, Douglas-fir habitat types (SWLO Section record files, Pfister et al. 1977). Suitable elevations and habitat types (Pfister et al. 1977) occur in the analysis area. In addition, boreal owls have been found nesting in mixed conifer and Douglas-fir stands in Idaho (Hayward 1994), and could occur in these types in the project area and analysis areas. However, regardless of elevation or type, most cover has been extensively harvested, so habitat quality is lower than if harvest had not occurred. Boreal owls have not been recorded for this latitude / longitude (MBDD).

Townsend's Big-eared Bat

Affected Environment

Project and Analysis Areas

There are no known caves in the project or analysis areas. However, past mining has created shafts that would be suitable for winter hibernacula or summer maternity or day roosts in both the project and analysis areas. If caves or mines occur in the project or analysis areas, then Townsend's Big-eared Bat could occur as well. Stand 8 in the project area has been extensively mined, but it is not proposed for harvest.

Black-Backed Woodpecker

Affected Environment

Project and Analysis Areas

No recent stand-replacement burns, major insect infestations, or decadent lodgepole pine stands occur in the project or analysis areas. Lodgepole pine does occur throughout the project and analysis areas, but no stands are dominated by decadent, insect-infested lodgepole pine. Thus, it is likely there is no resident population of black-backed woodpeckers in the project or analysis areas. The BLM plans to burn portions of Section 25 T 13N R14W, Sections 19, 20, 30, 31, 32, and 33 T13N R13W, and Sections 5, 6, and 7 of T12N R13W, and these areas could potentially provide black-backed woodpecker habitat in the near future. The species has been found likely breeding in this latitude / longitude.

Other Sensitive Species

The following are sensitive species that occur on lands administered by the Southwestern Land Office. We examined habitats in the project and analysis areas, and information in the Montana Natural Heritage Program Database, and Montana Bird Distribution Database for each species. Due to limited available habitat and no confirmed records, we consider the species would not likely occur near the project area. Therefore, no direct or cumulative effects are expected for any of these species as a result of either alternative.

Coeur d' Alene Salamander- No fractured rock, waterfalls or splash zones occur in the project area.

Columbian Sharp-Tailed Grouse- No extensive grassland or shrub-steppe habitat occurs in the project or analysis areas. This species is only documented from northwestern Montana, near Eureka.

Common Loon- No large lakes occur in the project or analysis areas. This bird breeds in this latitude / longitude outside the analysis area.

Ferruginous Hawk- No extensive grassland habitat occurs in the project or analysis areas. There are no records for this species in this latitude / longitude.

Harlequin Duck- White-water habitat is absent from the project and analysis areas.

Northern Bog Lemming- No fens, bogs or substantial moss-dominated areas occur in the project or analysis areas.

Mountain Plover- Shortgrass prairie habitat or prairie dog towns do not occur in the project or analysis areas.

Other Species of Interest

Goshawk

Affected Environment

Goshawks nest in relatively dense late-successional forests, usually in close proximity to water. Downed logs provide habitat for goshawk prey, and goshawks forage in a variety of forest structural stages, including openings. The project area provides potential goshawk habitat, and they are reported to breed in this latitude / longitude.

B. EXISTING ENVIRONMENT Riparian and Wetland Communities-

The affected environment for riparian areas and wetland communities with regards to this proposed action is the same as for other hydrology issues. Please see this chapter, section III Existing Environment, subsection **H Existing Environment Hydrology**.

C. EXISTING ENVIRONMENT Native Fisheries-

Fish habitat was surveyed in the Elk Creek Watershed in 1997. The mainstem Elk Creek was delineated into three segments, based on stream channel type and condition. The lower segment stretches from the Blackfoot river to the confluence of Elk Creek and Cap Wallace Creek. The middle reach lies between Cap Wallace and Yreka Flats. The upstream reach extends from fish passage barriers at Yreka Flats to the headwaters of Elk Creek. These passage barriers effectively isolate the upstream reach from downstream fish populations. The fish passage barriers in the Yreka area are characterized as old dredge cuts and ponds (Section 23 T13N R14W).

Downstream from Cap Wallace the mainstem was found to contain populations of brook, cutthroat, rainbow, and brown trout; mountain whitefish, longnose sucker, coarsescale sucker, longnose dace and sculpin. The reach extending from Cap Wallace to Yreka Flats and the upper reach above Yreka were both found to only contain brook trout.

Westslope cutthroat trout are currently under petition for listing as a threatened species under the Federal Endangered Species Act. Westslope cutthroat are also considered a *Class A species* by the State of Montana: defined as having limited number and /or limited habitats both in Montana and elsewhere in North America; elimination from Montana would be a significant loss to the gene pool of the species or subspecies.

Overall habitat conditions in Elk Creek can be summarized as having low habitat diversity with a preponderance of riffle habitat and a low number of pools, and low amounts of large woody debris. Channelization due to roads and mining in the middle and upper section of the drainage has limited the diversity of habitat. Segments of the Elk Creek County Road are poorly located and in very poor condition. Direct sediment delivery to the stream is occurring in many of these locations.

Fish habitat was surveyed in Kennedy Creek in 1980 by the BLM. Habitat was ranked at 72 % optimum. Fish were observed in low numbers. Aquatic insects were scarce throughout most of the stream. Fish habitat features (pools and cover) were ranked *good*.

Fish habitat was surveyed in Keno Creek by the BLM in 1975 and 1980, and was found to be marginal. No fish were observed. Two potential fish passage barriers near the confluence with Elk Creek were identified. Bottom material is composed of approximately 50% granitic sand. Aquatic insect diversity was fair. Dense vegetative cover heavily shades the stream and high amounts of coarse woody debris formed many small pool features.

Many of the streams in the affected environment have been impacted by accelerated rates of sedimentation. Historic and recent mining, the existing road system and current gazing management practices have contributed to these impacts. Monitoring data collected by the BLM shows that water quality in Keno Creek and Upper Elk Creek (above Keno Creek) is high in regards to suspended solids. The BLM has used turbidity measurements as a surrogate for suspended solids concentration. Based on turbidity data collect to date, conditions in both Keno Creek and Upper Elk Creek are considered to be a close approximation of historic levels (BLM 1999). In this context, data collected from Lower Elk Creek and Kennedy Creek indicates that water quality in these streams is impaired. Water quality impacts in both these drainages are largely attributed to road related delivery of sediment.

D. *EXISTING ENVIRONMENT Threatened, Endangered, and Sensitive Plants-*

The Montana Natural Heritage Program was consulted regarding Threatened, Endangered, and Sensitive plants within the proposed project area. There are no recorded species within the proposed project area. *Cypripedium parviflorum*, the Small Yellow Lady's-Slipper, has been recorded (1924) in section 2, T.12 N., R .14 W. approximately one mile to the southwest of the proposed project area. In 1992, relocation was attempted throughout the area without success. No other TES plants have been recorded in the area.

E. *EXISTING ENVIRONMENT Human Developments-*

Within the project area there are limited human developments. There is an old cabin located near the junction of Keno-Kennedy and Elk Creek roads where the proposed "Ned's Road" would leave the Elk Creek Road. There are some remnants of rockwork by Chinese miners upstream from the old mining claim in the same area.

F. *EXISTING ENVIRONMENT Private Land Access Using the old Skimmerhorn Road-*

The old Skimmerhorn Road is located in the far northwest corner of section 36. It junctions with the Elk Creek County Road in section 25 T.13 N., R.14 W. after crossing Elk Creek from the west. From DNRC ownership within section 36, it continues primarily westward through DNRC ownership in section 35 and then onto BLM and private holdings. This road has been used for access of the private holdings within the Skimmerhorn drainage. Although this road has been left open by the DNRC for this reason, it is a poorly located and poorly designed road that contributes sediment to an unnamed tributary of Elk Creek. Although this tributary eventually goes subsurface before reaching Elk Creek, it remains a priority to decrease erosion and sediment. It is unclear at this time if this road was ever declared a county road (section 36 has been included within Missoula, Granite, and Powell Counties over the last 100 years). At this time Missoula County does not recognize this road as a county road.

G. EXISTING ENVIRONMENT Cultural Resources-

Within the project area, the only known cultural resources are the Chinese rockwork and the old cabin mentioned in section IV subsection E. ***EXISTING ENVIRONMENT Human Developments***. No other cultural or archeological sites have been identified.

H. Aesthetics and Visual

Scenic Quality

The Elk 36 project area is located within the Columbia Rockies character type of the Rocky Mountain Region. Land forms found within the Elk 36 project area consist of rounded ridges with moderate to steeps slopes and low rolling bottom lands.

The landscapes in the general area are influenced by glaciation and steep glaciated peaks with lower rolling ridges typify the area, and aesthetic kettle lakes (such as Harper's Lake in the Clearwater Junction area) are located along valley floors.

The rounded ridges that dominate the area are primarily covered with coniferous vegetation. This is a mixture of different conifers (ponderosa pine, western larch, Douglas-fir, lodgepole pine, etc.) with some hardwoods (black cottonwood, aspen, and willows) dispersed in the draws, along seeps, and along the shores of bodies of water. South and west facing slopes in the area are often somewhat open. These areas are often covered by scattered coniferous vegetation and predominantly are a grass and brush community.

For the most part, the often visible checkerboard ownership pattern common in the Blackfoot and Clearwater River drainages is not readily apparent when looking at the project area. Although the area has seen a long history of timber harvest, only rarely does it vary from the form, line, color, and texture of the surrounding unharvested areas. Much of this area has been in State ownership (either D.N.R.C. or Lubrecht Experimental Forest) or Federal (Bureau of Land Management) for many years and has not seen the extensive harvest that much of the industrial ground in the greater area has.

The project area has few "distinctive" features. Distinctive landscapes are those where the features of landforms, vegetative patterns, water, and/or rock formations are of unusual or outstanding visual quality. Some of the more distinctive rock outcrop features are the granite spires in the Yreka Flats area.

Within the greater project area, there are several small bodies of water to note. Elk Creek has several residences, mostly seasonal mining cabins, concentrated along the upper stretches of the stream, and the Paws Up Ranch located in the lower reach valley.

The view from much of the area is that of flat to rolling benches with sharply rising ridges. These have primarily solid tree canopy from these viewpoints.

The general sale area is used by the public for many outdoor activities including; hunting, hiking, fishing, horseback rides, snowmobiling, berry picking, driving for pleasure, and sight-seeing.

The project area itself is visible from the Garnet Range Road, the Elk Creek County Road, and Keno-Kennedy Road.

Existing Scenic Integrity

"Scenic integrity" has to deal with the "state of naturalness" or state of disturbance created by human activities or alterations". This project area has been inventoried as having a MODERATE scenic integrity level overall. Areas within the drainage are however inventoried much lower. Some areas of past mining activities have been inventoried as UNACCEPTABLY LOW. Those areas include the mine tailings within Yreka Flats, the old State mining claims within Section 36, and various other patented and BLM claims within the drainage.

Areas with moderate scenic integrity "appear slightly altered, however, noticeable deviations to the landscape must remain visually subordinate to the overall viewed landscape". "Unacceptably Low" is where "deviations from the landscape are extremely dominant and borrow little from natural color, line, texture, form or scale".

Other actions that have caused deviations to the scenic integrity of this area are connected to past timber harvesting and other forest management activities. Some of the most obvious effects of past harvesting are evident as an introduction of textures not commonly found in the inherent vegetative patterns of this project area. Examples of this are the BLM seed tree units to the south of Yreka Flats.

Visual Absorption Capacity

This area was inventoried to determine its Visual Absorption Capacity or VAC. VAC is defined as the "physical ability of the land to support management activities and to maintain scenic integrity". Factors that aid in determination of the VAC are: the natural forms, lines, colors, and textures; the distance between the project area and the viewpoints; the estimated number of viewers; and the relative sensitivity of those viewers to the scenery around them.

As just stated, one of the factors that determines VAC is the distance between the project area and the viewpoints. This is generally categorized into three groups; foreground viewing (distances from the viewer's position out to around 2 mile), middle ground viewing (distances from 2 mile to 4 miles from the observer), and background viewing (distances greater than 4 miles from the viewer's position). A subgroup of foreground viewing is the detailed feature landscape within the first few hundred feet of the observer.

Often slope impacts the amount of VAC by enhancing any changes in form, line, color, or texture. In the simplest terms, the steeper the slope, the lower the VAC. This means that a harvest prescription that is barely visible on gentle sloping ground can be highly visible when on steep ground.

Scenic Inventory

The general project area was inventoried during the summer and fall of 2000. Four separate areas were used to accomplish this inventory. Three areas (Informational Sign along the Garnet Range Road, the Junction of Keno-Kennedy Road and Elk Creek Road, and Denny O'Laughlin's Cabin site) were fixed points, and one area was a segment of road (Elk Creek County Road) with continuous viewpoints being sampled.

Informational Sign- This informational sign and "pull-out" is located along the garnet Range Road between the road to Garnet Ghost Town and the junction of the Garnet Range Road and Elk Creek County Road. Several Photographs were taken and a "seen area map" was made. From this vantage point, much of the project area is middle ground viewing. Other areas of the project would not be visible from this location. The area seen from this viewpoint has a MODERATE scenic integrity.

Junction of Keno-Kennedy and Elk Creek- From this viewpoint, much of the project area is hidden from view by tree canopy and topography. Portions of the project area are visible through road right-of-way clearings and over the tree canopy in the bottom of Keno Creek. Areas that are visible are foreground viewing. These areas are of MODERATE scenic integrity. The view from this particular viewpoint is dominated by the old State mining claim across Elk Creek Road that is UNNACEPTABLY LOW scenic integrity.

Denny O'Laughlin's Cabin- From this viewpoint, only parts of the project area are visible. The BLM's project however will be very visible from this site. The proposed Elk 36 project is far foreground to middle ground viewing. The area seen from this viewpoint meets MODERATE scenic integrity.

Elk Creek County Road- As expected, a strip of land either side of the road can be seen as you drive through the project area. This is all immediate foreground or foreground viewing. Portions of this road segment have very steep hillsides and therefore have a low VAC. Hillsides within the project area (middle ground viewing) can occasionally be seen, but due to the fact the road is in the canyon bottom, only portions can be seen. It can be assumed that further areas would be seen as trees would be removed. There are also several old mining claims that would be visible along this road. The proposed project area viewed from this road has both MODERATE and UNNACEPTABLY LOW scenic integrity. Old cutting units, and roads are also visible along this travel route. Although these are noticeable, they are subordinate to the overall visual landscape during the drive.

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

CHAPTER IV
ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The purpose of Chapter IV is to disclose the environmental consequences of implementing the alternatives that are described in Chapter II. The environmental effects presented in this chapter form the scientific and analytical basis for the comparison of the various alternatives. Appendix C lists the mitigations that would be applied to each Action Alternative to mitigate impacts to various resources.

A. ENVIRONMENTAL CONSEQUENCES BY RESOURCE

EFFECTS UPON DRIVER ISSUES

Overstory cover and movement corridors

Project Area

No Action
Without harvest, there would be no short-term change to overstory cover and movement corridors. No roads would be built, so security would remain high. Risk of stand-replacement fire would increase, a potential long-term negative effect to retaining overstory cover.

Action
Physiographically, the best potential movement corridor is along Elk Creek, but the quality of the corridor is low because of the Elk Creek Rd., located adjacent to the creek and open yearlong. The area along the west side of the creek is more flat than the area along the east side. The flatter, west side would remain unchanged. Proposed harvest on the east side would occur adjacent to ~ ½ of the road length, on steep slopes suitable for cable systems. However, these steep slopes are not highly appropriate for potential movement corridors. The SMZ itself would not be entered. Therefore, there would be little change from current conditions along the Elk Creek riparian potential movement corridor.

The ridgetop potential movement corridor would be roaded, but the road would be closed with a gate. Some cover would remain adjacent to the road, and steep slopes would continue to provide security from view. If administrative traffic is minimized, and if snowmobiles do not use the road (which would be illegal but feasible for them to do so), then that area should continue to provide a potential movement corridor. However, the ridge would not be as remote as if the road were not built.

In treated portions of the project area, overstory cover would be decreased, generally from mid-canopy levels. However, some cover would persist by leaving large-sized trees with the largest crowns throughout the harvested area. Vertical cover would also persist in microsites of doghair lodgepole retained (~ 5-acres in size), generally in the southern-most unit. In addition, cover would be retained in the following unentered patches:

- The area adjacent to Keno Creek;
- A large patch in the northeast portion of the section
- A large patch in the southeastern corner of the section
- The entire west side of the section.

In summary, there would be direct and long-term reductions to overstory cover and potential movement corridors by removing cover and by road building, especially along ridgetops. However, mitigation measures (e.g., leaving most trees with the largest crowns, effectively closing roads with gates, and leaving unentered areas, particularly riparian zones and the entire west side of the section) would help ameliorate negative effects. It is important to understand that not all acres were densely forested under natural historic conditions. As explained in Chapter III, section III, subsection I, wildfire was a major disturbance factor in pre-settlement times. High intensity crown fires would have removed overstory cover, and some species would have depended on this niche habitat.

Analysis Area

No Action
With no action, there would be no change from current conditions. There would be a gradual cumulative negative effect to overstory cover by increased risk of stand-replacing fire. However, fire suppression would still occur, which would decrease negative effects.

Action
No BLM harvest is planned adjacent to Kennedy Creek in Section 25 (T13N/R14W). (Some would occur upslope from the creek, however.) Harvest is planned in Section 19 (T13N/R13W), but not near riparian areas. Some riparian areas are included in the BLM's planned prescribed burning. However, overstory trees with large crowns would likely survive those actions. No BLM harvest is planned for Section 35. Therefore, overstory cover and potential movement corridors would be available after the proposed BLM actions. Potential movement corridor patches are disjunct from each other, but are loosely connected to the Section 36 project area. Another area that provides a potential corridor is in Sections 13-15 (T13N/R14W) along north-facing slopes of the North Fork of Elk Creek. None of that area is included in the BLM proposal. Cover through Section 29 southwest along a ridgetop through Section 31 west to Section 36, however, is proposed for harvest and burning by the BLM. Therefore, with the BLM proposal, there would be short-term reductions in overstory cover, depending on how much overstory was removed. Effects to current overstory cover amounts would be mitigated by retaining most of the largest trees—with the largest crowns—which is prescribed. In addition, cover and potential movement corridors would be retained in unentered areas listed above. There would be long-term cumulative benefits to retaining cover by reducing risk of stand replacement fire now.

Old Growth Habitat and Components—Large-sized Snags and Coarse Woody Debris

Project Area

No Action
Without harvest, understory trees would continue to compete with larger, older trees. Douglas-fir, lodgepole pine and subalpine fir would continue to compete with ponderosa pine and western larch. Large trees would die and provide snag habitat in the short-term. However, fewer medium-sized trees would grow to the large-sizes preferred for old growth-associated wildlife species than if stands were thinned. In addition, without opening stands, fewer ponderosa pine and western larch would become established, eventually interrupting the supply of large-sized trees of these species. Without some thinning agent, the risk of stand-replacing fire would be greater than if thinning occurred. Therefore, without harvest, there would be a short-term increased in decadence. This would be followed by a long-term decrease in large-sized live and dead trees. Eventually, this would result in less recruitment of large pieces of coarse woody debris.

Action
Harvest would be confined east of the Elk Creek Road. Even so, several large patches there would not be entered (Figure 2.2, Proposed Sale Area Map. Given past harvest and relatively young ages, none meet the Green et al. (1992) definition. Harvest would generally retain the large-sized ($\geq$18 inch dbh) ponderosa pine and western larch, and in more moist stands, large Douglas-fir. If large larch were infected with mistletoe, the trees generally would be retained but girdled. This would create some large-sized larch snags in the short-term. Some large trees may be removed,

due to landing or road placement, however. Therefore, there would be a short-term increase in large-sized snags, a short-term decrease in culls, snags, and large woody debris in areas of road and landing placement, and a short-term increase in coarse woody debris due to harvesting activity and retention requirements.

"Thinning from below" would reduce competition stress to large-sized trees. Therefore, large-sized trees would remain living longer than if stands were not thinned. In addition, thinning would help promote growth of medium-sized trees into large-sized trees more than if stands were not thinned. Large larch infected with mistletoe generally would remain on site, but would be girdled. New roads would be closed (gated), so that public access would remain limited. Due to steep topography, gates should be effective in keeping passenger vehicles off the closed roads. Therefore, firewood-cutting levels should not increase from current levels. Thus, with mitigation of leaving most large-sized trees, there would be long-term increase in large-sized trees, snags, or coarse woody debris. There would be a long-term benefit by thinning from below large-sized trees and reducing fire risk.

Analysis Area

No Action

Without harvest, stands would continue to age and stem densities would increase. There would be no short-term change to large trees, snags, culls, and downed woody debris. There would be a gradual increase in decadence. However, recruitment of large-sized trees would gradually slow, because of increased competition stress. This would reduce the potential for large-sized trees, snags, or coarse woody debris on the site until disturbance occurred. Risk of stand replacement fire would increase, a long-term cumulative negative effect to the analysis area. However, implementation of the BLM's action lowers the risk in the eastern side of the analysis area.

Action

Several fairly large patches would not be entered with this proposal. No large trees would be removed from these areas, yet they would reap the benefits of lowered fire risk from fuel removal in adjacent stands. These total ~ 419 acres, and include the following:

- The area adjacent to Keno Creek;
- A large patch in the northeast portion of the section
- A large patch in the southeastern corner of the section
- The entire west side of the section.

Old growth habitats and components are relatively scarce in the analysis area. Planned harvest by the BLM is to "thin from below" large-sized trees and reintroduce understory burning. Therefore, there would be low negative cumulative effects to the recruitment of large-sized trees, snags, and downed woody debris in the analysis area. Considering that the BLM and DNRC treatments were planned to compliment each other, the resultant patch sizes should be larger and should disregard artificial property boundaries, than if each entity worked separately. Therefore, there would be a cumulative benefit by retaining large-sized trees, reducing the risk of stand-replacing fire, increasing overall patch size, and responding with complimentary treatments across property boundaries in the project and analysis areas.

Unit-wide

No action

There would be no short-term change to large trees, snags, culls, and downed woody debris. With time, stands would age and decadence would increase. However, recruitment of large-sized trees would gradually slow, because of increased competition stress. This would reduce the potential for large-sized trees, snags, or coarse woody debris on the site until disturbance occurred. Risk of stand-replacement fire would increase, resulting in a long-term negative effect.

Action
There would not be any short-term change to large-sized trees, snags, culls, and coarse woody debris at the unit level. As no old growth stands would be treated, no effects (short-term, long-term, or cumulative) to current old growth amounts at the unit level would be expected.

Road Building

Project Area

No Action
With no harvest, no roads would be built. There would be no change from current conditions—1.87 miles of drivable roads open for public use. Habitat security in the project area would remain relatively high, due mostly to steep and broken topography. There would be a direct, long-term and benefit from letting 2.13 miles of old road continue to re-vegetate.

Action
Although the section was previously roaded and logged, the roads were located in areas that are unsatisfactory by today's standards (see water quality sections of this document). Most roads have re-vegetated and would not be reused. The section is steep and broken, so that road placement is difficult. Therefore, to manage the section for timber harvest, new roads would need to be constructed. With harvest, ~ 3.32 miles of permanent road and 1.69 miles of temporary road would be built. This totals 5.01 miles of road. Not all of the road constructed would be within section 36, some roads also cross onto adjoining BLM ownership. Approximately .78 miles of road would be on BLM ownership with .49 miles being permanent and .29 miles being temporary. Road densities for section 36 would increase from ~ 1.87 miles to ~ 6.7 miles /mi^2 of road post-harvest. The "open" road portion would remain the same—1.87 mi/mi^2 (Elk Creek, Keno, and Skimmerhorn). Permanent and drivable road densities would total 4.52 mi/ mi^2. Levels greater than 4.7 mi/ mi^2 are considered extremely high (Wisdom et al. 2000) related to wildlife populations and habitats.

Road building generally has serious negative effects to wildlife species. These include direct habitat loss and fragmentation and indirect effects such as displacement of animal populations. Wisdom et al. (2000:p112) outlined 13 negative effects to wildlife species from road building and the presence of roads. These include the following:

1. Snag reduction
2. Down log reduction
3. Habitat loss and fragmentation
4. Negative edge effects
5. Over-hunting
6. Over-trapping
7. Poaching
8. Collection
9. Harassment or disturbance at specific-use sites (e.g., leks, communal roost sites)
10. Movement barrier
11. Displacement or avoidance
12. Chronic, negative interactions with humans.

Most of these effects occur when previously roadless and unharvested areas that have been acting as "source" habitats are roaded. In addition, negative effects are greater where roads remain open or drivable. Because the project and analysis areas have been extensively roaded and logged, they are likely not functioning as source habitats for some species vulnerable to human disturbance (e.g., grizzly bear, wolverine). Also, the project and analysis areas already contain a diversity of edge habitat. Therefore, the two areas have experienced most of the negative effects from roadbuilding already. Essentially, most of the damage has already been done. Nevertheless, negative effects from road building can be partly mitigated, and are explained below.

The amount of road open to public use with vehicles (~ 1.87 miles) would remain the same as pre-harvest. These include the Elk Creek, Keno Creek, and Skimmerhorn roads. There is no opportunity to close any of these public roads. All temporary road surfaces would be "slashed", so that the surface would not be available for easy walking or bicycling. All newly built permanent roads would be closed with gates. Closures would be relatively effective to passenger vehicles because of steep and broken topography in the project area. There would be short-term direct negative effects to habitat security when the roads would be in use. With effective road closures, there would be some long-term negative effect from administrative vehicle use in the project area. If roads are closed effectively, there should be no increased risk to snags and cavity users. Hunters would likely use the new permanent roads because the Elk Creek Road forms the boundary of the "walk-in" area. Therefore, hunters could drive to the new roads in Section 36 and walk or ride them from their origin. If hunters use the new roads with mountain bikes or walking, there would be a long-term negative effect to habitat security from building the new permanent roads and keeping the surfaces passable. There would be a direct, long-term and cumulative benefit from letting 2.13 miles of old, poorly located roads re-vegetate, the same as in the No-Action Alternative.

Snowmobiles could physically use the new roads. Currently, the ridges where roads are planned are passable to snowmobiles. They would likely receive little use, because they 'go nowhere', but it is feasible to negotiate a snowmobile route there now. However, when the roads would be closed to passenger vehicles, they would also be officially closed to snowmobile use. Appropriate road closure signs would be posted at gated areas. Therefore, post-harvest snowmobile use might not be expected to be greater than it is currently. Legal snowmobile use would be lower, because the roads would be officially closed to snowmobiles.

In summary, road densities would be high post-harvest. There would be direct and long-term negative effects to wildlife and their habitats by road-building and keeping portions of roads drivable (although closed to public access). Negative effects would be partly mitigated by circumstances related to this specific area. In particular, the section is not currently acting as a source habitat for species usually negatively affected by road building. In addition, steep topography would increase gate closure effectiveness for passenger vehicles. Therefore, the extent of some negative effects (e.g., removal of snag habitat, decreased downed logs, collection, harassment) would reduced. However, negative effects would remain greater than if all newly constructed road surfaces were slashed and therefore impassable post-harvest.

Analysis Area

No Action

Without harvest, there would be no change from current conditions. However, roadwork planned by the BLM would continue (BLM 2000). There would be no negative cumulative effects resulting from road building in the project area portion of the analysis area.

Action

With implementation of the BLM project, road density would increase in the analysis area. New permanent roads through Section 36 would be gated, so that there would be no cumulative negative effect from (public) passenger vehicle use on the new roads. There would be a slight cumulative negative effect to habitat security if hunters use the new permanent roads with bicycles or walking. Given high use of the walk-in area (Burcham et al. 1998) hunters would likely use the new roads for foot or bicycle traffic.

Big Game Considerations

Project Area

No Action
With no harvest, there would be no change from current conditions. There would be no short-term negative effect to moose, white-tailed deer, and elk habitat. There would be a long-term negative effect by increased risk of stand-replacement fire. However, risks would be reduced by burning planned for adjacent lands, to be conducted by the BLM, and by continued fire suppression.

Action
Harvest would occur in areas used by moose, white-tailed deer, and elk. However, riparian habitats—preferred habitats for moose—would not be entered. Protecting riparian zones would benefit moose (Burcham et al. 2000:77). In addition, some adjacent upland would not be entered as well. Trees with large crowns, especially spruce, provide canopies that intercept snow. These are important features for moose and wintering populations of elk and white-tailed deer. Trees with the largest crowns generally would be retained during harvest. In addition, areas with spruce would generally be excluded from entry. Therefore, there would be slight negative effects to cover by harvest, because harvest would open up stands. With mitigation, there would be negligible long-term negative effects to habitats important to moose, because some areas would not be entered, and because trees with large crowns would be retained. Burning would provide a direct benefit to moose habitat, by stimulating growth of preferred foods, including shrubs, especially red-ozier dogwood. Building permanent roads would allow more walk-in access to the section, a direct and long-term and cumulative negative effect to big game habitat.

Analysis Area

No Action
Without harvest, there would be no change from current conditions. No roads would be built, so general habitat security would remain high. There would be no short-term negative cumulative effects to big game habitat. There would be a gradual increase in risk of stand-replacement fire. This would be a long-term cumulative negative effect. If the BLM implemented their proposal, risk of stand-replacing fire would decrease in the project area and would decrease the cumulative negative effect.

Action
Harvest and burning proposed and planned by the BLM would generally benefit moose, because large trees would be retained, and browse foods would be stimulated by burning. As in the project area, there would be slight negative cumulative effects to cover by harvest, because harvest would open up stands. With mitigation, there would be little long-term negative effects to habitats important to moose, because some areas would not be entered, and because trees with large crowns would be retained. In riparian areas, no harvest is planned, but the BLM would conduct burning. Burning would provide a benefit to moose habitat, by stimulating growth of preferred foods—shrubs, especially red-ozier dogwood. Building permanent roads would allow more walk-in access to the section, increasing contact with big-game animals and humans. This would be a cumulative negative effect to big game habitat. Although moose harvest is by permit only, hunters do use the area in pursuit of elk and deer.

Effects upon Soils

No Action
The No-Action Alternative would have little direct effect on soil resources. Existing skid trails and roads with inadequate drainage would continue to erode without maintenance. Existing skid trails that are revegetating will slowly stabilize.

Action
Proposed harvest would remove understory and densely overstocked trees to improve spacing, growth, and utilization of scarce available soil moisture and nutrients. Timber harvest, slash disposal and site preparation activities can cause rutting, erosion, soil compaction and displacement. Potential for soil impacts is high on tractor units and below average on cable units. On tractor units the area of detrimental impacts would be minimized by implementing mitigation measures for season of use, skid trail planning and limiting disturbance to the amount needed for silvicultural goals.

The most economical method for harvest is by mechanical harvesting and whole tree skidding, but this method removes nutrients in needles from the site and can impact site quality, unless woody debris and foliage is returned to the stand. Selection harvest units would log length skid timber on planned skid trails. Slash, needles and coarse woody debris CWD (a minimum 10-15 tons/acre >3" dia.) would be retained on site to provide for long term nutrient cycling. Units that will be cable logged will have negligible effect on soils. Broadcast burning should have a short-term beneficial effect on soil nutrients.

There would be some minor long-term effect to soils associated with road relocation, that would be balanced by improved roads and stabilizing old roads. Surface erosion would be effectively controlled by installing adequate drainage features on roads and skid trails, followed by prompt revegetation of disturbed soils with site adapted grasses. Potential soil impacts should be avoided or reduced to acceptable levels by road and harvest planning, implementation of BMP's and the recommendations included in **Appendix C Mitigations by Resource**.

Cumulative Effects to Soil Productivity

No Action
Cumulative effects could occur from repeated ground based entries into the harvest area with each entry depending on the area and degree of impacts. Previous harvest and mining activities built extensive roads and trails in the section. Placer mining along Elk creek was reclaimed in 1984. Old harvest south of Keno creek used extensive skid trails and some steep roads that are mostly revegetated. Old trails on ridges and moderate slopes are barely discernable while some of the trails on steeper slopes are deeply rutted and revegetated with alder.

Action
The Action Alternative involves ground skidding that could result in cumulative effects if the area and degree of impacts is not limited. Cumulative effects would be controlled by limiting the area of new detrimental soil impacts to less than 15% of harvest units, by skid trail planning, using existing trails (on suitable locations) and by retaining woody debris and foliage for nutrient cycling. Temporary roads would be stabilized and revegetated. Any future harvest would likely use the same road system and skid trail planning and therefore presents low risk of cumulative effects. Large woody debris will be retained for nutrient cycling and long term productivity and therefore presents modest risk of cumulative effects to soil productivity.

Road Access & Effects of Action Alternative:

We reviewed the primary routes for road access. Main access is from the south over the Garnet Range Road and north via the Elk Creek. The Garnet range access road is in good condition with some maintenance. Considerable road improvements are planned by the BLM and Missoula County for portions of the main Elk Creek road to repair and reconstruct problem areas, where erosion and water quality are concerns. The DNRC does not plan to use the problem areas of the Elk Creek County Road.

There is a network of system, secondary and spur roads on State lands and adjacent ownerships. Within section 36, the main Elk Creek and Keno creek roads are in fair shape and can be used with some standard maintenance. Existing road conditions and drainage will be inventoried to prioritize site specific improvements that provide access and control erosion with all Action Alternatives. Portions of existing roads that were built at steep road grades with short pitches up to 20%, narrow width (a safety risk), and in some poor locations, do not comply with BMP's and would not be suitable for use.

New road construction will provide long-term access routes on improved grades that should require less maintenance.

Effects of Alternatives on Noxious Weeds

No Action
With no-action, noxious weeds, principally knapweed would continue to spread along existing roads and onto drier vegetation types, mainly south slopes.

Action
With the proposed timber harvest action, ground disturbing activities have the potential to introduce or spread noxious weeds in susceptible habitat types. The Action Alternative objective for weed management is to prevent new establishment of noxious weeds and control established populations along open roads. For this project an Integrated Weed Management (IWM) approach would be implemented that would include: prevention, revegetation and weed control measures for spot outbreaks, which are considered the most effective weed management treatments. Short term effect would be to reduce existing noxious weed populations and increase native plants and seeded grasses. Where weeds are replaced with grasses, erosion would be reduced due to the improved plant cover. Herbicide applications would be primarily along disturbed roadside edges and spot treatments of small infestations. To protect water quality, herbicide would not be applied where runoff could enter surface waters or riparian features.

Watershed and Fisheries Effects

This section addressed the anticipated effects of the no action alternative and the proposed action alternative on water and fisheries resources within the affected watersheds. The primary concerns related to these resources are potential impacts to water quality and aquatic habitat and the effects of these impacts on downstream populations of westslope cutthroat trout and other beneficial uses such as aquatic life support, irrigation and livestock water uses. In order to address these issues the potential direct, indirect and cumulative effects of the proposed action alternative on sediment delivery and water yield were analyzed.

The following table summarizes the road and harvest activities proposed under the action alternative for each watershed analysis area:

Table 4.1- Summary of Proposed Activities by Watershed Analysis Area

Watershed	Proposed Harvest (Acres)	Road Const. (miles)	Temp. Road Const. (miles)	Existing Road Abandon (mile)	Existing Road Improved (miles)
Kennedy Creek	77	1.9	0.49	0.75	0.1
Keno Creek	72	1.05	0.50	1.1	0.4
Elk Ck. Face	79	0.37	0.70	0.25	0
Totals	228	3.32	1.69	2.13	0.5

Water Quality

The primary risks to water quality within the proposed timber sale area are roads, especially roads located along or crossing streams. Risk of erosion and sediment delivery are highest when roads are located in areas with inadequate buffering between streams and other drainage features, on erosive soils, or on steep and/or unstable slopes. A lack of periodic maintenance and adequate surface drainage features, and use during wet periods or conditions may also contribute to higher risk.

No Action
All of the existing roads within and accessing the proposed timber sale area have been inventoried and reviewed by a DNRC hydrologist and soil scientist. The existing roads were evaluated to determine both existing and potential risk of erosion and sources of sediment delivery to streams. Many of the existing roads within the proposed sale area are poorly located, contain steep grades and do not fully comply with minimum BMPs. Several segments of existing road are eroding and were determined to be contributing direct sediment delivery to streams or at risk of contributing to direct delivery. For example, stream flows from an unnamed tributary to Elk Creek located in the NW ¼ of the State section have been intercepted and diverted down the surface of the Skimmerhorn Road. As a result, considerable amounts of road surface erosion and sediment delivery to the stream is occurring. These road segments will continue to be chronic sources of erosion and potential sediment delivery unless relocation, surface drainage and stream crossing improvements are implemented.

Action Alternative
Under the proposed action alternative, approximately 3.32 miles of new road and 1.69 miles of temporary road would be constructed. Approximately 2.13 miles of the lower standard existing road would be permanently closed and abandoned under the proposed action. Most of the new road construction proposed would be necessary to relocate segments of this existing road segments that would be abandoned. Improving these segments to a standard that would meet minimum BMP's and provides adequate protection to water quality is not feasible in many cases. In addition, the section is steep and broken, so that road placement is difficult. Therefore, to manage the section for timber harvest, new roads would need to be constructed. Also under the proposed action alternative, approximately 0.5 miles of existing road will be improved to a standard that fully complies with BMPs.

All of the road improvements and new road locations included under the proposed action alternative have been reviewed and inventoried by a DNRC hydrologist and soil scientist. The existing roads and proposed road locations were evaluated to determine both existing and potential risk of erosion and sources of sediment delivery to streams. Some short-term increases in sediment delivery to the unnamed tributary drainage's may occur during and/or shortly after the installation of the proposed new culverts stream crossings. Application of BMPs, and site-specific design and mitigation measures are expected to reduce erosion and potential sediment delivery to an acceptable level as defined under the Montana Water Quality Standards. Acceptable levels are defined as those conditions occurring where all reasonable land, soil, and water conservation practices have been applied.

The proposed action alternative includes plans to address and correct several existing road problems and reduces long-term erosion and sediment delivery concerns. These plans would include installation of sufficient road surface drainage features, and improving the cross drainage structures. The proposed road improvements and abandonment are expected to result in reduced erosion and sediment delivery to streams and ephemeral drainage features within the proposed projected area. The proposed road construction, road abandonment and road improvement activities are not expected to result in long-term or substantial short-term impacts to water quality. The proposed road improvements in Skimmerhorn Creek are expected to result in improved water quality, improved protection of cold-water fisheries and other downstream beneficial uses when compared to the current existing conditions.

All proposed harvest stands have also been reviewed and evaluated in the field by a DNRC hydrologist and soil scientist. Selection of appropriate operating seasons, limiting equipment operations to suitable slopes or designated trails and appropriate ground conditions, and implementation of appropriate BMPs and mitigation measures will be used to reduce the risk and severity of soil erosion and potential sediment delivery to streams and ephemeral drainage features. In addition, streamside management zones and equipment restriction zones will be designed to effectively buffer streams and other ephemeral drainage features from harvest activities. Equipment restriction zones will be utilized to limit erosion risk within all ephemeral draw bottoms.

No impacts to water quality, cold-water fisheries or other downstream beneficial uses are expected to result from the proposed harvest activities. Implementation of the proposed action alternative is expected to reduce long-term erosion and risk of sediment delivery to streams and draws draining the State parcel. Implementation of the proposed action alternative would meet the requirements of new and ongoing activities conducted in 303(d) listed streams prior to TMDL development.

Cumulative Watershed Effects

Cumulative watershed effects are off-site, downstream changes in hydrology, sediment production, transport and storage in response to a combination of multiple land management activities. The MAGIS computer model was utilized to determine average annual water yield under a no action alternative and the proposed action alternative.

No Action

The potential cumulative impacts of increased water yield associated with the no action alternative were simulated with the MAGIS model using a mixed fire severity scenario. The projected water yield increases under the no action alternative were similar to those estimated under existing conditions and those predicted under the proposed action alternative (see Table 4.2 – Modeled Water Yield Increases).

Table 4.2 - Modeled Water Yield Increases

Watershed	% Water Yield Increase (WYI) Existing Conditions	% WYI No Action with Mixed Severity Fire Decade 1	% WYI Proposed Action Decade 1
Elk Creek	3.7 %	3.9 %	3.6 %
Kennedy Creek	2.1 %	2.6 %	4.5 %
Keno Creek	4.9%	5 %	4.6 %

Under the No Action Alternative, none of the activities proposed under the Action Alternative that are designed to reduce existing and potential erosion and sedimentation would occur. Approximately 2.13 miles of existing road would not be permanently closed and abandoned, and 0.5 miles of existing road would not be improved to meet minimum BMPs. The existing risk of cumulative watershed impacts due to erosion and increased sediment yield would remain under No Action. Therefore, the risk of cumulative impacts due to increased sediment yield is higher under the No Action Alternative.

Action Alternative

A similar analysis was completed for the proposed actions using the MAGIS to determine the potential hydrologic effects of the proposed actions when combined with past or other ongoing activities. See Table 4 for a summary of the results of the MAGIS modeled cumulative watershed effects analysis.

Estimated water yield increases under the proposed action alternative are similar to those levels estimated under exiting conditions and predicted under a mixed severity fire regime under no action. Based on this analysis, no detrimental cumulative watershed effects due to increased levels of water yield (increased magnitude or duration of peak flows) are expected to result from the proposed timber harvest and road construction. This conclusion is based on the low levels of existing and predicted water yield increase, the existing levels of forest canopy cover are similar to those expected under unmanaged conditions (pre-settlement and pre-fire suppression), the partial canopy removal prescriptions included in the proposed action, and the relatively stable condition of the potentially affected stream channels.

The proposed prescription would remove approximately 45-50% of the basal area from those stands treated. The amount of residual forest canopy remaining following harvest would have a compensating effect, which limits the potential for additional offsite water delivery. The remaining forest stands will likely utilize most of the soil moisture available onsite during the growing season and still provide a large degree of canopy area for interception of rainfall and snowfall.

No detectible increases in sediment yield are expected to result from implementation of the proposed action alternative. The activities proposed under the action alternative would address several sources of erosion and sediment delivery identified on existing roads located within the project area. Approximately 2.13 miles of existing road would be permanently closed and abandoned. Another 0.5 miles of existing road will be improved to meet minimum BMPs and to reduce erosion and sedimentation risk. Implementation of the proposed action is expected to reduce long-term erosion risk and sediment yields on the State section.

Effects upon Fire Ecology

No Action

Under this alternative, the current trend of increased fire severities and consequences would continue. Although fire suppression would continue, the risk of a stand replacement wildfire increases. A stand replacement wildfire would return the stands affected to an early successional state. If wildfire were to continue to shape the stands from that point, eventually they would reach pre-settlement conditions. Fire suppression will however continue, so stands would actually develop back into what exists today without management (pre-commercial thinning, etc). With this alternative, DNRC would not re-introduce fire to the project area. There is potential of a large wildfire (8,000 to 10,000 acres) if a stand replacement fire was to occur under the proper conditions (very-high to extreme fire conditions atmospheric conditions conducive to large fire growth) and escape initial containment in the proposed project area (Colin Moon, pers. com.). This would be similar to the 1994 East Fork Chamberlain Fire approximately 8 miles northeast of the proposed project area. If such a fire were to happen, it would change the fire ecology landscape of the surrounding area for many decades. No roads would be built to assist with fire suppression efforts.

Action

As part of the Action Alternative, timber harvest would be used to approximate a lower intensity medium severity fire. The resulting species composition would return to a closer approximation of pre-settlement conditions. The trees remaining would generally be of the classic "fire-hardy" species of the area including ponderosa pine, western larch, and large thick barked Douglas-fir. This species mix would be expected to regenerate and continue the species composition with continued management. The reduction in ladder fuels and other available forest fuels would be expected to decrease potential fire intensity across the area. Lower fire intensity increases the ability to suppress fires. Inherently, the lower intensity fires would have less direct effects upon the ecosystem. Roads built under the Action Alternative would assist in fire suppression. This proposed action in conjunction with the BLM project would increase the cumulative benefit of decreased risk of large, stand replacement wildfires within the greater Elk Creek drainage.

Although timber harvest fuels burn with high intensity, this is generally within a few years of harvest. Energy release component numbers for logging slash is quite high, although generally only during the "red slash" phase. Treatment of the logging slash is required under the Montana Hazard Reduction Agreement Law (1947). Although the Montana DNRC is not subject to this law, we voluntarily comply. In basic terms it requires fuels from logging slash will be treated so a fire would meet a flame length standard. Flame length is the length of the flame from tip to base. The required flame length maximum is four feet (considered the upper end of control without equipment such as bulldozers). The flame length is determined by calculating the fuel loading (how much fuel), the fuel depth (how deep is the slash), the slope of the ground, and assuming a "Standard Day". A "Standard Day" is defined as 87° F. temperature, 17% relative humidity, and a wind speed of 20 miles per hour measured at a 20 foot standard height. Treatments of logging slash would include prescribed burning, piling, trampling, slashing (cutting remaining slash to a level closer to the ground), or chipping. Chipping is generally not realistic on a large scale unless it is an "in woods" pulp chipping operation.

Several areas would also be treated with prescribed fire to decrease fuel loadings and to reintroduce fire into the proposed project area. Risks involved with prescribed fire include: loss of containment, loss of higher numbers of reserve trees than expected, smoke related concerns, fire burning to lesser or greater severity than prescribed, and damage to improvements such as culverts. All areas proposed for treatment with prescribed fire would require a completed burn plan (a plan designating purpose, personnel and equipment levels, weather and fuel conditions needed, and an escaped fire plan) Several areas may be burned cooperatively with the BLM. This allows for cheaper burning costs and a greater amount of personnel for control. The prescribed burning would provide a benefit by decreasing the amount of fuel available for a wildfire, promoting regeneration, and regenerating grass and forage species for wildlife (especially big game such as moose, elk, and deer). The prescribed burning of larger tracts (such as in conjunction with the BLM) increases the cumulative benefits to the area. There is a risk of short-term increases in nutrient levels within the streams due to runoff after prescribed fire. Larger burn units also increase the amount of smoke released. This could cause short-term cumulative effects. Both the BLM and DNRC are members of the Montana Airshed Group, which regulates slash burning. DNRC and BLM would receive an Air Quality Permit and perform the proposed burn when conditions are deemed appropriate by the Montana Airshed Coordination Group.

Effects upon Decreased Growth and Vigor of Trees

No Action

Under this alternative, conditions contributing to decreased growth and vigor of trees would continue. It is expected regeneration of shade tolerant species would continue. This would to move stands further away from the "appropriate conditions" that existed during pre-settlement times. The climax tree species dominating stand development and structure would continue. At current stocking levels, trees eventually would "stagnate" (grow at very reduced rates). As limited resources for tree growth (water, nutrients, and light) become more scarce, the risk of insect or disease infestations becomes much greater. As insects and disease increase, the potential of large scale epidemics increases. This would provide a cumulative risk. These factors combined would decrease the growth and vigor of the stands. As this continued, these factors also would increase the chance of stand replacement wildfire and would be a cumulative risk involving the drainage. Salvage of dead and dying timber would still continue as part of the DNRC management, although the lack of a road infrastructure makes it very difficult.

Action
Under this alternative, the retention of the majority of the largest trees of seral species would occur. Much of the lodgepole pine, sub-alpine fir, and overstocked Douglas-fir would be removed. By reducing stand density and altering species composition to levels more typical of pre-settlement times, we would expect an increase in growth and vigor. The removal of trees most susceptible to insects and disease, and reducing the available fuel loadings, the risk of stand replacement wildfire would be reduced. The reduction of stand density would make limited resources (water, nutrients, and light) much more available to the remaining trees. The proposed prescribed burning would increase the chance of seral regeneration and would also provide a quick flush of nutrients for tree growth. The proposed harvest and regeneration would move these stands closer to "appropriate conditions". Improved stand health would provide a benefit to the management of this section for School Trust needs in the future. The decreased risk of stand replacement wildfire and insect and disease infestations would provide a cumulative benefit.

Effects upon Economics, Benefits, and Expected Project Revenues

No Action
Under this alternative, no economic contribution to the School Trust would occur above the current sale of the State Lands Recreational Use License from this section. This would have a direct effect upon the DNRC's obligation to provide the School Trusts with income. It could be assumed that the selection of this alternative would also have a short-term cumulative adverse effect upon timber jobs in the Blackfoot area.

Action
Under this alternative money would be generated for the School Trusts. For the benefit of the economic analysis it will be assumed that .75 MMBF or 750 MBF of sawlog material would be harvested. Current delivered log prices (logs delivered to the mill) average out to be approximately $350 per MBF. From this amount we would need to subtract the cost of harvesting (felling, processing, skidding, loading, and hauling). For the benefit of this analysis that cost is assumed to be $165 per MBF. This residual value of $185 per MBF is referred to as stumpage. Multiplying $185 per MBF and the expected volume of sawlogs (750 MBF) we arrive at a gross stumpage for sawlog material of $138,750. Through the length of the contract if this project is implemented, the price of sawlog material may be escalated according to the Western Wood Products Association Inland Lumber Price Index.

The value of "roundwood" and pulp is currently $28 per ton delivered. Harvesting costs (approximately $25 per ton) would then be subtracted leaving a residual value of $3 per ton. Assuming 500 MBF of pulp material (or 3,250 tons), our gross stumpage of pulp material is $9,750. Pulpwood would not be escalated.

The amount of forest improvement collections from this sale would be $34.90 per MBF. This would be applied to the sawlog volume harvested. The forest improvement collections would be approximately $26,175. This money would be deposited in the forest improvement fund to be used for thinning, prescribed burning, planting, weed management, etc. on Trust lands.

From this amount the cost of road construction and improvements must be subtracted. The proposed road construction (permanent and temporary) would be 5.52 miles. The average price per mile of roads within the Clearwater Unit is around $13,000 per mile. Multiplying the miles of road proposed and the average price per mile equals $71,760. Assuming approximately $1,000 per mile in improvements (gravel, culverts, etc.) an additional $5,520 would be added raising this to $77,280.

The gross stumpages of sawlog and pulp material would be added raising the gross stumpage to $148,500. The forest improvement collections and road construction costs would be subtracted from this amount leaving us with a net stumpage return of $45,045. This is the approximate amount of money deposited in the School Trust.

The permanent road constructed by this proposed sale would improve access for management for the next entry and would be an investment. The temporary roads constructed would be usable after some minor work. The low infrastructure cost during the next entry would be a benefit. The proposed action should result in greater growth rates and higher volumes. The increased volume per acre would obtain a higher stumpage. Traditionally, long-lived seral species (ponderosa pine, western larch) have been valued higher than lodgepole pine and sub-alpine fir. Given that this trend continues, the value would increase for the next entry. The proposed action alternative would also decrease the risk of stand replacement wildfire, ensuring that the trees within project area would remain high value. The decreased risk of large wildfire would also decrease the risk to surrounding areas providing a cumulative benefit.

If this proposed project was implemented, it would provide work for a road building contractor, a logging contractor, their subcontractors, and their employees. The forest products would most likely be processed local mills providing further job opportunities.

EFFECTS UPON NON-DRIVER ISSUES

Effects upon Endangered, Threatened, and Sensitive Species and Other Species of Interest

No Action
There would not be any direct or cumulative effect to these species primarily due to their absence (Pileated Woodpeckers were heard in the area however) from the area. Some effects could occur due to changes to the forest stands with the absence of wildfire. There would continue to be a departure from historic stand and species composition away from the habitat requirements needed. The risk of stand replacement wildfire would also increase. If a stand replacement wildfire was to occur, some species (Black-Backed Woodpeckers for example) could benefit

Action
There would not be any direct or cumulative effect to these species primarily due to their absence (Pileated Woodpeckers were heard in the area however) from the area. The risk of stand replacement wildfire would be diminished. There is little preferred habitat in the project area.

Effects upon Riparian and Wetland Communities

No Action
All effects, direct and cumulative are discussed within the ***Watershed and Fisheries Effects*** portion of this chapter.

Action
All effects, direct and cumulative are discussed within the ***Watershed and Fisheries Effects*** portion of this chapter. As part of the proposed action, the Streamside Management Act would be followed. As part of this law, only limited harvest can occur within riparian and wetland areas. This proposed action would remain outside of all riparian areas and wetlands for harvest, with the only entry being for road construction with the appropriate 124 permits from Montana DFWP.

Effects upon Cold Water Fisheries

No Action
None of the proposed road abandonment and road improvements included under the proposed action alternative would occur under the No Action Alternative. These improvements are expected to result in reduced erosion and sediment delivery to streams and ephemeral drainage features within the proposed projected area (see Water Quality and Cumulative Watershed Effects section). Therefore, the anticipated effects of No Action would be higher risk of direct and cumulative impacts to cold-water fisheries habitat when compared to the Action Alternative.

Action Alternative
No direct, indirect or cumulative impacts to cold-water fish or cold water fish habitat is expected to result from the proposed action alternative No timber harvests are proposed within the Streamside Management Zones (SMZ) of fish bearing streams. Therefore no reduction in the levels of potential large woody debris recruitment, stream shading and no increases in stream water temperatures are expected under the proposed action. All SMZ widths will comply with the Montana Streamside Management Zone Law and Rules, and all applicable Watershed and Fisheries Resource Management Standards outlined in the State Forest Land Management Plan.

All proposed road construction and road improvements will fully comply with minimum BMP's. Site-specific mitigation measures designed by DNRC hydrologist will be implemented at all stream crossings to minimize the risk of sediment delivery and to prevent impacts to stream channels. No new stream crossings are planned for fish-bearing streams. The proposed road abandonment and road improvements are expected to result in reduced erosion and sediment delivery to streams and ephemeral drainage features within the proposed projected area (see Water Quality and Cumulative Watershed Effects section). The anticipated effects of these proposed activities would be improved water quality and improved protection of cold-water fisheries habitat in all affected streams.

Populations of Bull Trout located downstream in the Blackfoot River will not be affected by the proposed action.

Effects upon Threatened, Endangered, and Sensitive Plants

No Action
There are no foreseen direct or cumulative effects expected under this alternative.

Action
Since the Small Yellow Lady's-Slipper *Cypripedium parviflorum* has not been recorded within the project area, no foreseen direct or cumulative effects expected under this alternative.

Effects upon Human Developments

No Action
There are no foreseen direct or cumulative effects expected under this alternative. Aging of structures and potential vandalism would continue to be risks.

Action
Under this alternative, no activity would take place in the vicinity of the Chinese rockwork. Therefore, no direct or cumulative effects are expected under this alternative. The cabin upstream from the junction of Keno-Kennedy Road and Elk Creek road would be in the immediate vicinity of the proposed junction of Elk Creek Road and the proposed "Ned's Road". Contract language and road layout would protect the cabin from damage during road building. Some out buildings (constructed in recent years and not associated with the cabin) would be torn down as they are

within the proposed road right-of-way. Aging of structures and potential vandalism would continue to be risks.

Effects upon Private Land Access Using the old Skimmerhorn Road

No Action
Under this alternative, no foreseen direct or cumulative effects are expected. Erosion of the road surface would continue, as would sediment delivery. No erosion control features would be put into place. The road would remain open until a new access road would be built.

Action
Under this alternative some erosion control features would be put into place. The road would remain open for access into private land in the Skimmerhorn drainage. Some of these erosion control features would be fairly abrupt to prevent their erosion and to remain effective for several years. The design and construction of a new access road would not take place under this proposed project. Other than the installation of erosion control and drainage features, no other direct or cumulative effects are foreseen under this alternative.

Effects upon Cultural Resources

No Action
Under this alternative no treatments would take place within the proposed project area. No foreseen direct or cumulative effects are expected. Natural agents (fire, weathering, etc.) would continue.

Action
No proposed activity is planned within the immediate vicinity of any known cultural resources (cabin and Chinese rockwork). Although some out buildings would be destroyed, the proposed "Ned's Road" would still be 40-50 feet from the old cabin. No other cultural resources are known within the proposed project area. The DNRC archeologist has not recommended any further investigative work. Timber harvesting, road building, and prescribed burning as well as the natural agents mentioned above could damage undiscovered cultural resources. Since no known cultural resources exist within the project area, no foreseen direct or cumulative effects are expected.

Effects upon Visuals

Analysis Methods

The visual resource analysis was conducted by utilizing the Visual Management System and the Scenery Management System. Both of these were developed by the U.S. Forest Service and have been used to describe the existing conditions, effects of actions, and mitigations for projects. Information used in this analysis was gathered from field visits, analysis of photographs and seen area maps, and the study of landscape patterns in the area.

Desired Landscape Condition

To determine guidelines for this project, two visual landscape management systems were used, the Visual Resource Management System (USDA 1977a, USDA 1977b, USDA 1980a, USDA 1980b), and the Scenery Management System (USDA 1995).

Through these methods, a desired Visual Quality Objective was derived.

The following definitions of Visual Quality Objectives apply to landscapes in this project area:

Retention: "Activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape and should not be evident to casual forest visitors".

Partial Retention: "Activities may repeat form, line, color, or texture which are found infrequently or not at all in the characteristic landscape, but remain visually subordinate to the visual strength of the characteristic landscape".

Modification: "Activities of vegetative and land form alteration must borrow from naturally established line, form, color, and texture so that their visual characteristics are those of natural occurrences within the surrounding area when viewed as middle ground or background. Activities may visually dominate the original characteristic landscape".

No Action

As part of the No Action Alternative, no changes to the visual quality of the State trust land would take place. It is assumed that logging would continue on adjacent BLM forestland. This would intensify the differences in canopy and produce continuous straight edges following ownership boundaries. No new roads would be constructed; therefore, no new roads would be visible. There would not be any timber harvest slash generated so the current scenic integrity would not be affected.

Action

Disturbances caused by the construction of roads and the harvest of trees may have an impact on the visual resource. This impact is caused by contrasts created between the natural landscapes and managed landscapes. The extent to which the activities would affect the visual resource varies with how much they contrast in form, line, color, and texture. These differences are often subjective and are based on individual human perception. The Visual Quality Objective (VQO) determines the degree of acceptable change.

Visual effects generated by timber management activities vary in duration and intensity according to the silvicultural treatment prescribed and the logging method used to achieve the silvicultural goals. Road building can expose light colored soils creating high color contrasts that can be seen for many miles. Clearings for roads may create openings that contrast in line and texture by appearing unnatural and straight. Over time, roads will revegetate and begin to blend with the natural landscapes. Slash also can contrast with the natural setting and can dominate viewing especially in the foreground. As slash cures, it changes to a reddish color that contrasts sharply to the natural greens, grays, and browns of a forest setting. This is generally a very short-term impact.

The introduction of fire can also have an effect on the visual quality of an area. Burning activities may be noticed as blackened ground surface, standing and downed dead tree stems, and red needles on trees. Effects of fire vary in intensity and visual recovery. Low intensity fires will generally recover within 1-2 years of burning. High intensity fires may take as long as 40-50 years to fully recover as standing dead trees fall and regeneration grows into adult trees.

Under this alternative, a large block of DNRC and BLM land in the project area would undergo some type of timber harvest and vegetation management. Many of these areas would be visible from the viewpoints described earlier. As the BLM and proposed DNRC projects would modify the vegetation in a similar manner, the effects of harvesting are lessened.

Due to the varying topography and small amount of area with high VAC within the project area, much of the proposed action could remain "hidden" to the casual observer. The areas of high VAC adjacent to the Elk Creek County Road would be noticeable. An experienced observer or someone who resides in the area would notice the changes to the other stands, mostly in the density of stands.

Where possible, much of the proposed cutting would be light to moderate in intensity. As the majority of the largest trees would be left, and a random, more natural spacing would be used, it would be easier to decrease contrast in form, line, color, and texture between treated and untreated stands. Silvicultural treatments would borrow extensively from the natural grassy openings and only slightly affect the texture of the seen areas. Likewise, silvicultural treatments near areas of dense forest would borrow from the higher tree numbers and general stand characteristics (species, size, etc.).

As much of the area would be viewed from either middle ground or background viewing from the majority of the viewpoints selected, the proposed action should meet the RETENTION VQO. In areas where harvest activity would be in the immediate foreground or foreground, the proposed action would be expected to meet the MODIFICATION or PARTIAL RETENTION VQO. As vegetation recovers, these areas should move more into the definition of the PARTIAL RETENTION VQO. These areas may eventually reach the RETENTION VQO. This, however, will take many years as the areas would have all reserve trees marked with blue paint, and the paint would need time to fade. Trees would be removed from the area adjacent to the Elk Creek County Road, which would reduce the number of stems that dominate the view. Currently the many small trees dominate the view. After removal of the smaller trees, the sight distance would be increased. The landform would become a more important part of the visual landscape. The largest trees and rock outcroppings would then become focal points and dominate the view.

Some areas proposed for harvest would be skyline yarded. These areas should still meet the MODIFICATION VQO due to the moderate harvest, blending between treated and untreated areas, and following topographic features to reproduce line and form occurring on the natural landscape. Any harvest would be more noticeable on these steeper slopes than on flatter ground due to the decreased VAC. Also due to the harvest method used, skyline yarding leaves long vertical lines visible on the hillside. This is the area called the "corridor" and is the area where the winched logs come in contact with the ground while traveling to the yarding area. The trees are removed from the corridor area to make the yarding easier. The most noticeable visual effect is the overturning of soil and displacement of shrubs and small trees near the middle of the corridor. These long vertical lines are often noticeable, but can be expected to revegetate within 1-3 years following harvest. Primarily, areas proposed for skyline yarding are located adjacent to the Elk Creek County Road along the western edge of the project area, or hidden from the viewpoints used during the analysis.

Road building often has noticeable visual effects. Through the course of road building, soil is overturned and vegetation is removed. The soil color contrast in comparison to the surrounding forest or grassland setting can cause the cuts, fills, and travel surface to become a focal point of the setting. Also, as vegetation is removed, gaps and notches in the vegetation (tree canopy) can be seen in the middle ground and even background viewing. These are noticeable as breaks in texture. Due to the linear nature of roads, often a departure from natural lines occurs.

Proposed new roads would be designed to borrow from the natural landform whenever possible, and undulate to break up their visibility and line. As these would be roads designed for transport of logs, these roads would follow the topography and be subordinate to it.

As the new roads would be built following benches, ridgetops, or across gentle ground, the roads would have a balanced cut and fill, and the need for high cut slopes (such as with full bench roads on steep terrain) would not be necessary. The prompt revegetation of the road surface, cuts and fills to prevent erosion would decrease the color contrast. Where possible, vegetation would be used to screen the roads allowing them to lie lightly on the landscape when viewed from middle ground to background viewing.

Cumulative Effects

Any change to the scenery in the area from these alternatives would be in addition to past timber harvests, road building, vegetation management (grazing, pre-commercial thinning, etc.) and fire activity within the project area. This analysis includes all past and present effects. Due to slash and the initial color contrasts of the slash and limited road building, there is an expected short-term impact. Given the treatments proposed and the planned BLM project, moderate risk of an increase in cumulative visual effects to the landscape would be expected.

LIST OF PREPARERS

Jeff Collins	Mt DNRC	FMB	Soils Scientist
Gary Frank	Mt DNRC	FMB	Hydrologist
Rose Leach	Mt DNRC	SWLO	Wildlife Biologist
Craig Nelson	Mt DNRC	CLW	Project Leader
Patrick Rennie	Mt DNRC	Lands	Archaeologist
Stephen Wallace	Mt DNRC	CLW	Decision Maker

FMB – Forest Management Bureau	Missoula, MT.
SWLO – Southwestern Land Office	Missoula, MT.
Lands – Lands Administration Division	Helena, MT.
CLW – Clearwater Unit	Greenough, MT.

LIST OF PERSONS CONSULTED

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Colin Moon	Unit Fire Supervisor	DNRC	Greenough, Mt
Pyramid Mountain Lumber Company			Seeley Lake, Mt
Smurfit-Stone Corp.			Frenchtown, Mt.

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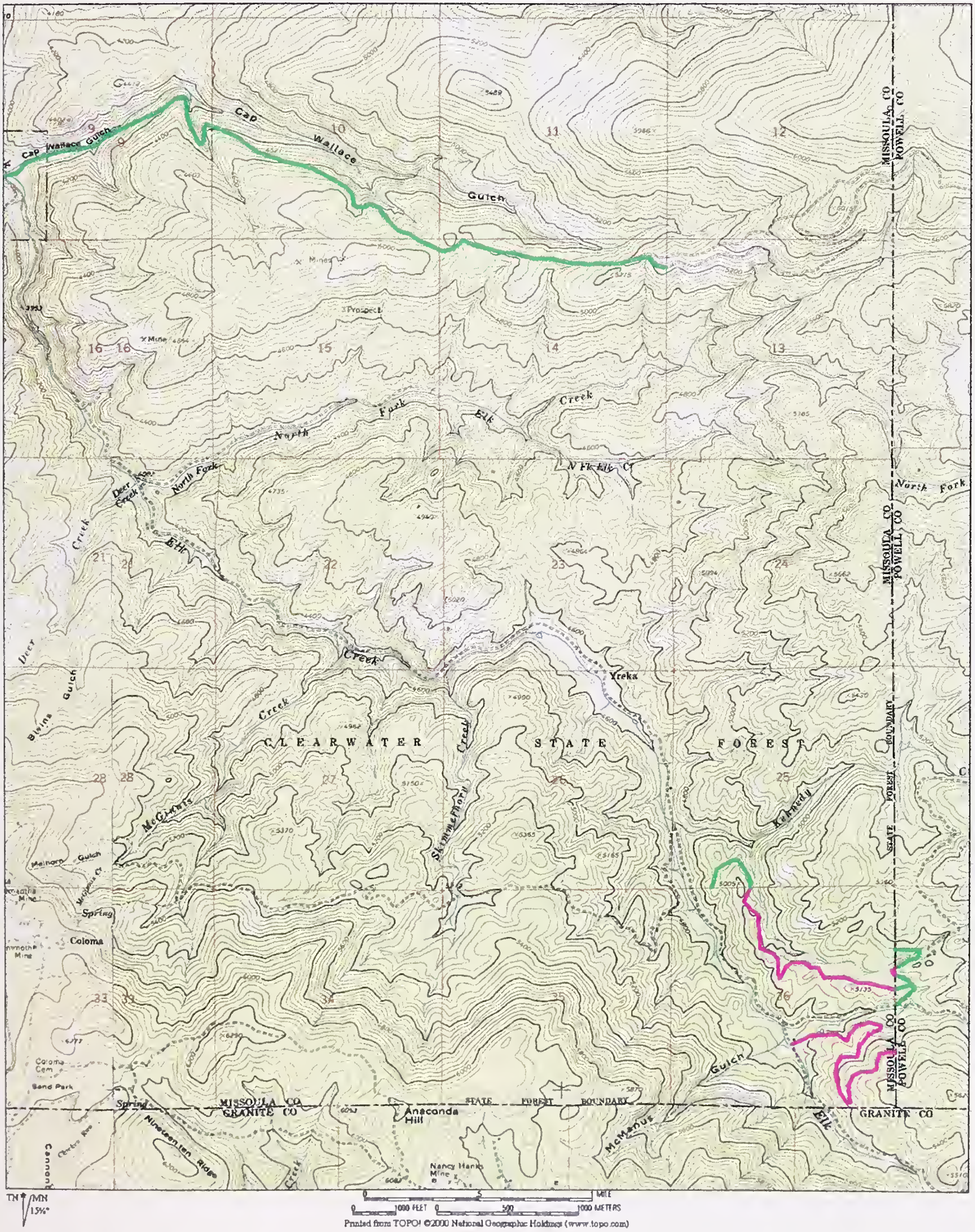
APPENDIX A
EXHIBITS AND MAPS

EASEMENT EXCHANGE BETWEEN THE MONTANA DNRC AND THE BLM

EASEMENT EXCHANGE



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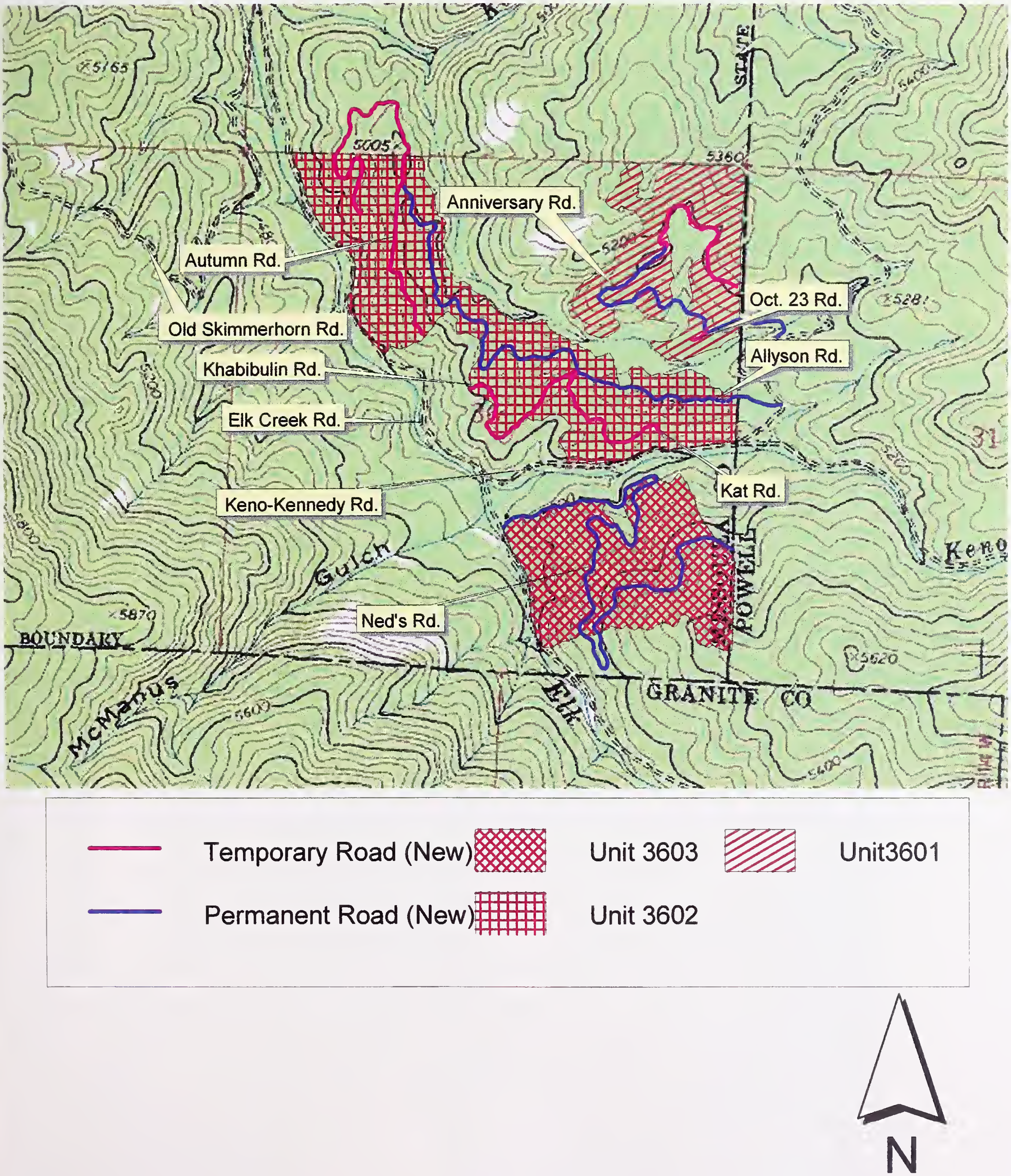
EASEMENT FROM DNRC TO BLM 〰

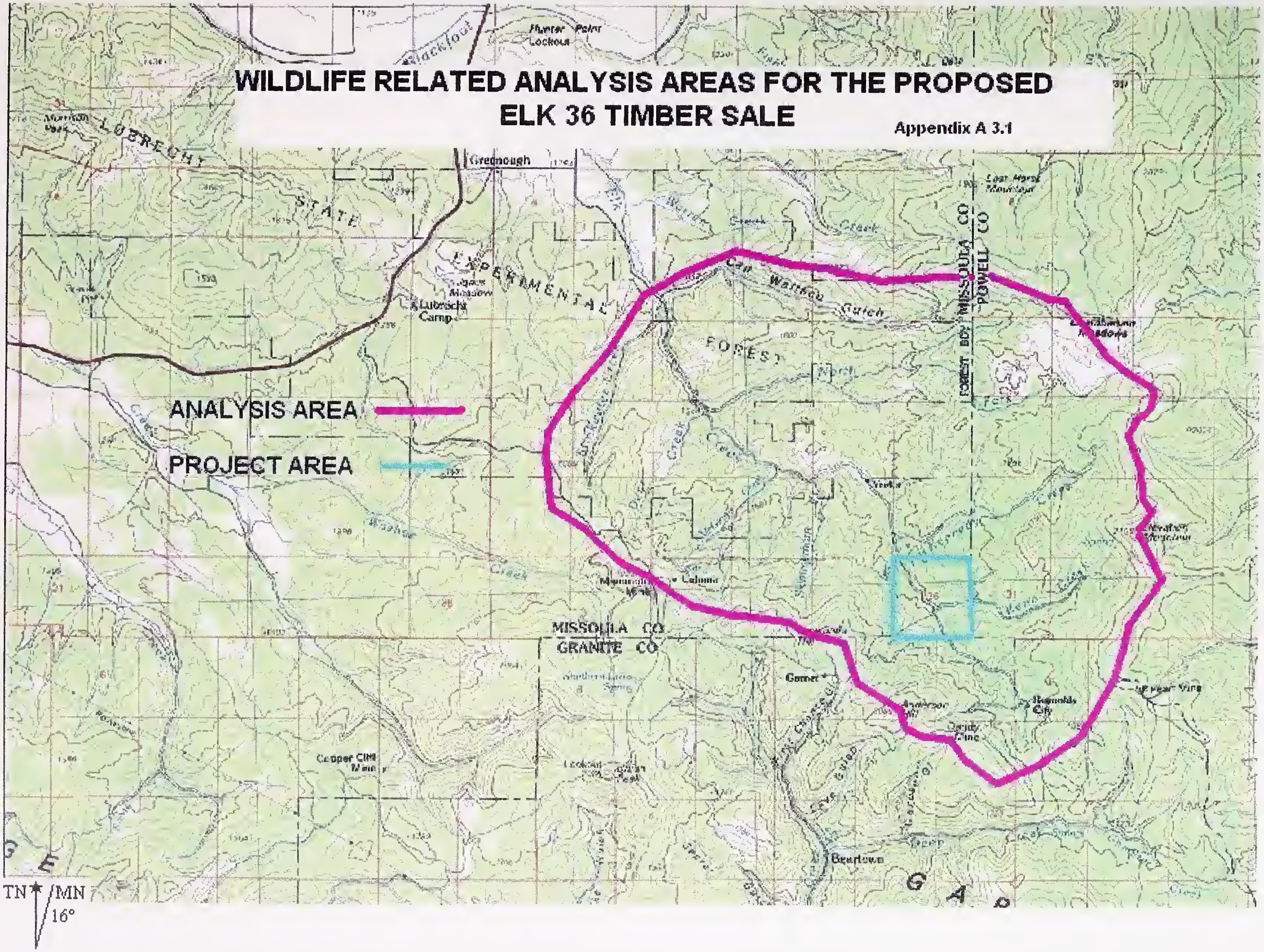
EASEMENT FROM BLM TO DNRC 〰

Elk 36 Timber Sale, DNRC (Proposed)



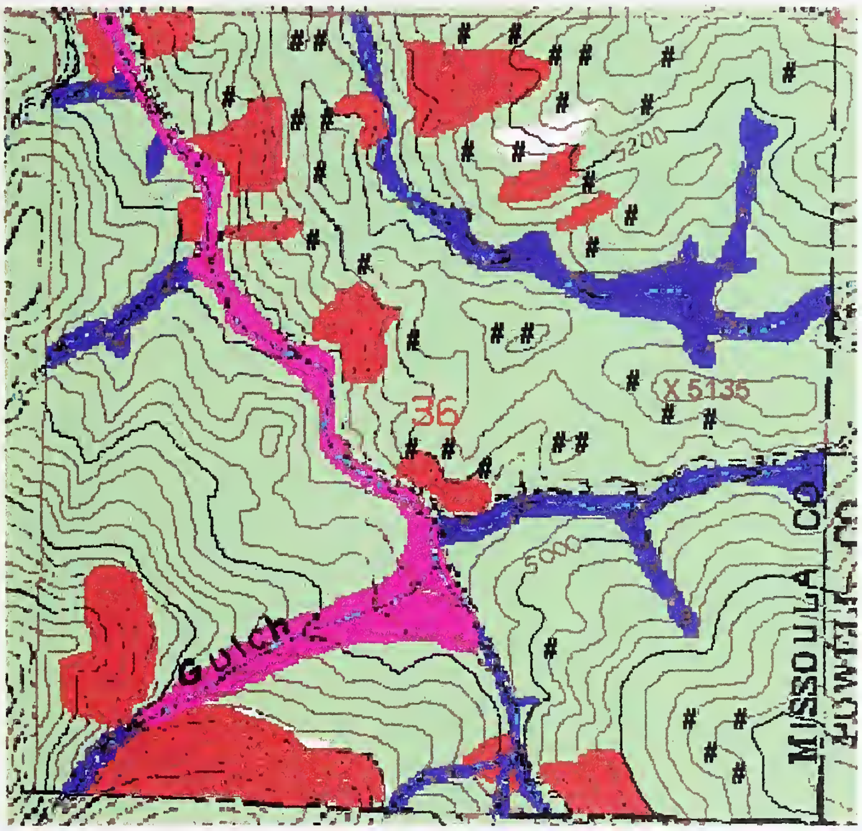
WILDLIFE RELATED ANALYSIS AREAS FOR THE PROPOSED ELK 36 TIMBER SALE

Appendix A 3.1



Appendix A 3.2

INOPERABLE GROUND AND DIFFICULT FEATURES WITHIN THE PROPOSED ELK 35 TIMBER SALE



🟥 SLOPES OVER 40% NOT SUITED FOR TRACTOR SKIDDING

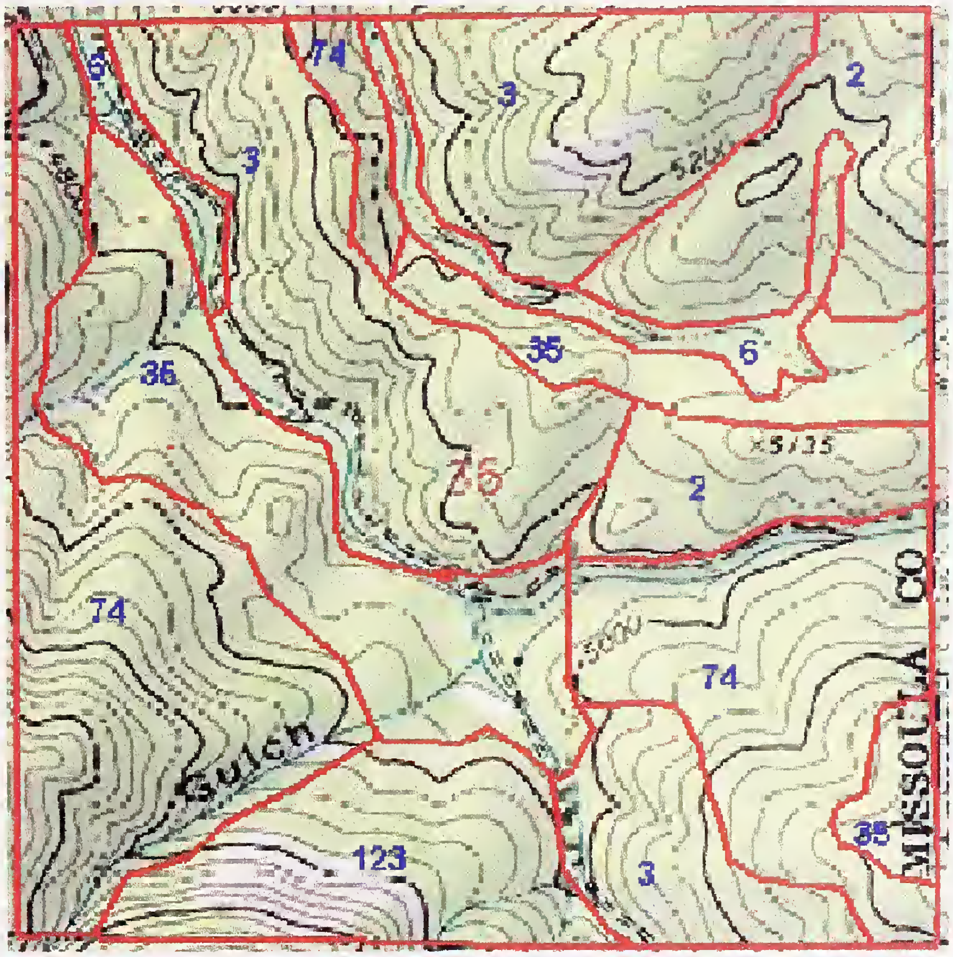
🟪 AREAS OF MINE RECLAIMATION AND SMZ

🟦 SMZ'S OR WET FEATURES

ROCK OUTCROPS

Appendix A 3.3

SOILS MAP FOR THE PROPOSED ELK 36 TIMBER SALE

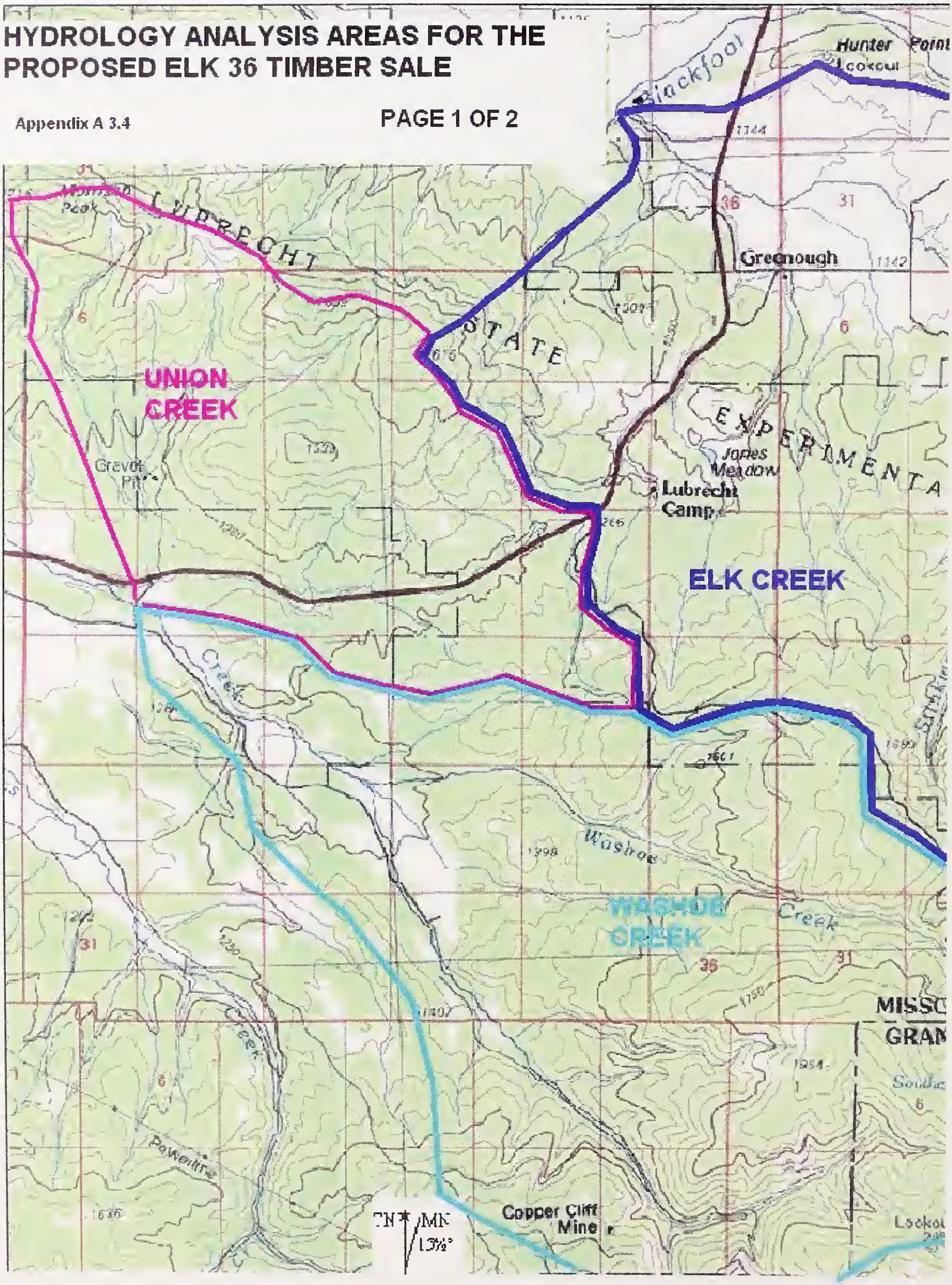


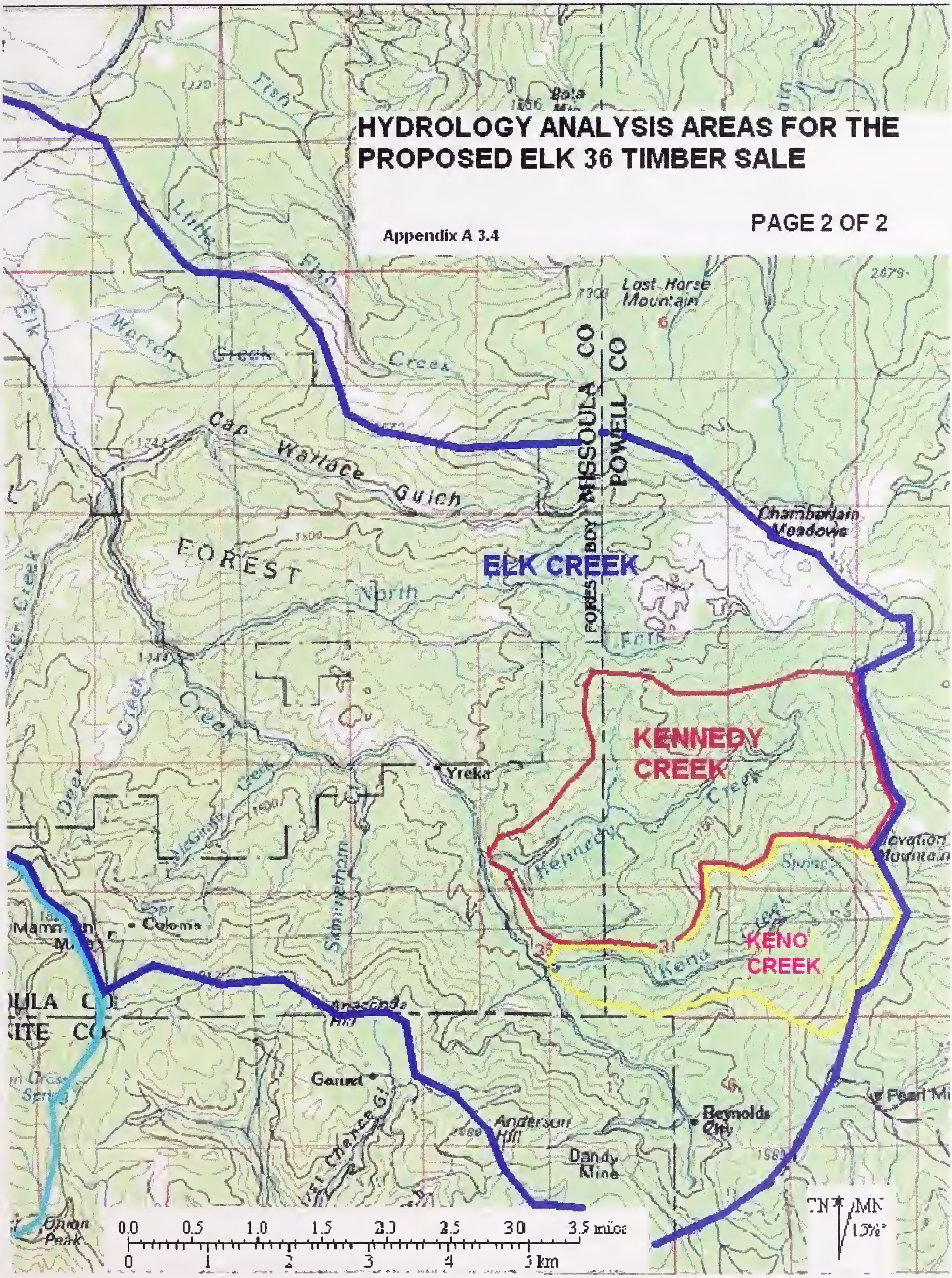
Number	Soil Name	Parent Material	Topsoil	Subsoil	Permeability Water Holding Capacity (WHC)	Erosion Hazard	Displacement Hazard	Compaction	Road Bearing Capacity	Notes
2	Ambrandt gravelly sandy loam 15-30%	Granite colluvium >60"	Gravelly sandy loam 0-4"	Very gravelly course sand	Droughty, moderate/ rapid up to 4" WHC	High	High	Low	Fair	Granitics suitable for tractor operation
3	Ambrandt-Rochester warm-rock outcrop complex 30-60%	Granite colluvium >60"	Gravelly sandy loam 0-4"	Very gravelly course sand	Somewhat excessively drained	High	High	Low	Fair	Some bedrock outcrops
6	Aquolls and Aquepts 0-2%	Alluvium	Silt loam	Deep silt loams and gravelly loams	Well drained	Moderate	Severe	Severe	Poor	Turnpike and gravel needed
35	Elkner-Ovando complex 8-30%	Granite colluvium >40"	Gravelly sandy loam 0-4"	Very gravelly course sand	Droughty, moderate/ rapid up to 4" WHC	Moderate To High	Moderate	Moderate	Fair	Granitics suitable for tractor operation
74	Ovando-Elkner Rock Outcrop complex 30-60%	Granite colluvium >40"	Gravelly sandy w/ ash 0-6"	Very gravelly course sand	Moderate/ rapid 3" WHC	High	High	Low	Fair	Some bedrock outcrops Granitics, very erosive, cable slopes >40%
123	Whitore gravelly clay loam 30-60%	Granite colluvium >60"	Gravelly clay loam	Very cobbly clay loam	Well drained	High	High	Moderate	Good	Clay at depth

HYDROLOGY ANALYSIS AREAS FOR THE PROPOSED ELK 36 TIMBER SALE

Appendix A 3.4

PAGE 1 OF 2





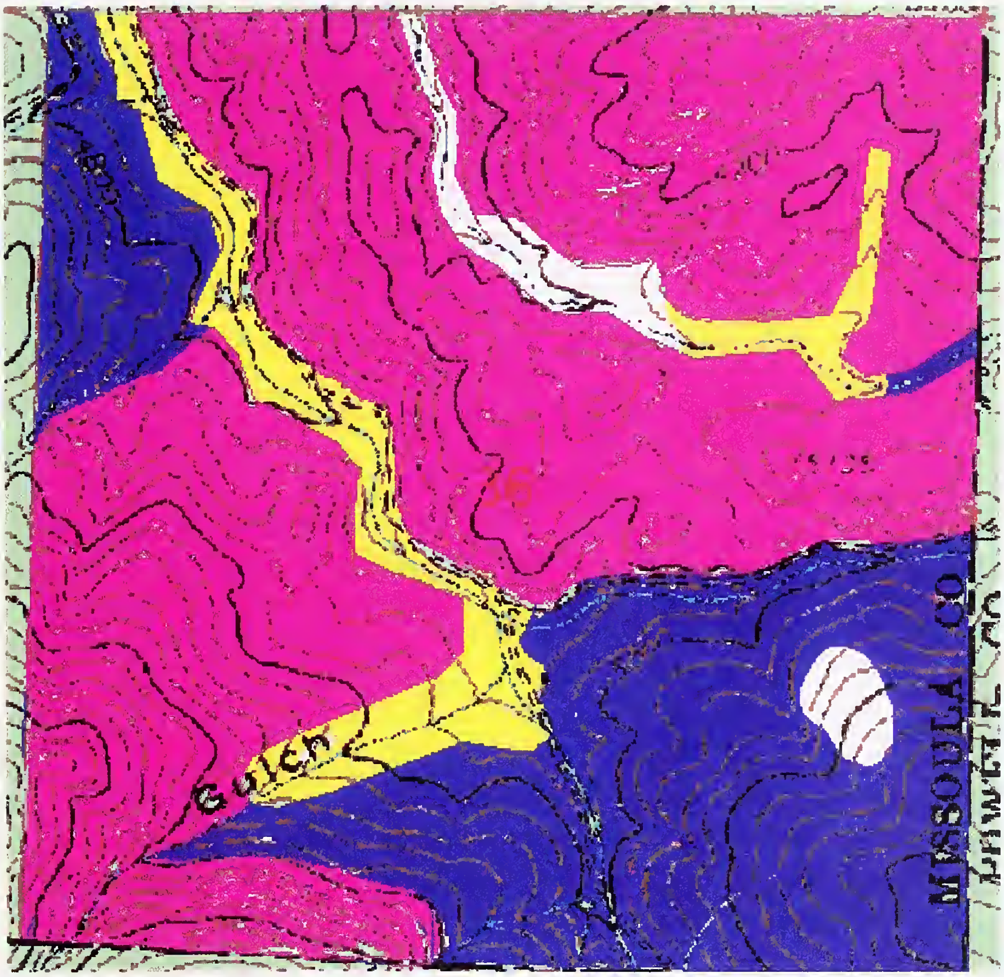
HYDROLOGY ANALYSIS AREAS FOR THE PROPOSED ELK 36 TIMBER SALE

Appendix A 3.4

PAGE 2 OF 2

Appendix A 3.5

FIRE GROUPS* WITHIN THE PROPOSED ELK 36 TIMBER SALE



🟨 **Fire Group Zero**	Fire Group Zero sites generally do not burn readily under normal summer conditions.
🟪 **Fire Group Six**	Fire Group Six sites experience generally low to moderate severity fires with occasional stand-replacement fires that favored lodgepole pine.
⬜ **Fire Group Seven**	Fire Group Seven sites are generally characterized by stand-replacement fires although some low to moderate intensity ground fires may occur.
🟦 **Fire Group Nine**	Fire group Nine sites experience generally moderate severity to stand replacement events. This range is determined by the amount of fuel buildup and the burning conditions. Moderate severity fires tend to favor western larch and Douglas-fir.

*** from Fischer and Bradley 1987**

APPENDIX B
INITIAL PROPOSAL AND PUBLIC NOTICE

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Missoula Field Office
3255 Fort Missoula Road
Missoula, Montana 59804-7293

IN REPLY TO:

MTI00-99-08

AND CONSERVATION

MARC RACICOT, GOVERNOR
STATE OF MONTANA
DIRECTOR'S OFFICE (406) 444-2074
TELEFAX NUMBER (406) 444-2684

JAN. 15 1999

Dear Interested Party:

We are writing to inform you that the Bureau of Land Management (BLM) and the Montana Department of Natural Resources and Conservation (DNRC) are beginning environmental assessments (EAs) for a proposed action which would affect forest, riparian, and aquatic habitat conditions in the Elk Creek watershed. Elk Creek, a tributary to the Blackfoot River, lies approximately 30 miles east of Missoula, Montana and is shown on the enclosed map. Many of the actions proposed are an outgrowth of an analysis which was developed cooperatively by the BLM, DNRC, and The University of Montana's Lubrecht Experimental Forest for lands which they administer in the Elk Creek watershed. The proposed action is consistent with the 1986 Garnet Resource Management Plan and DNRC's State Forest Land Management Plan and will not result in re-allocation of resources made in these land use plans.

The enclosure to this letter outlines the Proposed Action, the Purpose and Need for this action, and Initial Issues which an interdisciplinary team has identified. At least one alternative to the Proposed Action, a "No Action" alternative, will be examined in the EAs. The Proposed Action includes treatment of approximately 1,850 acres of public land administered by BLM (or "public land") and up to 335 acres of school trust land administered by the DNRC (or "trust land").

As we begin work on these assessments, you are invited to help us identify new issues or concerns or refine the initial issues which will be addressed in our assessments. Please send your comments to this office no later than February 5, 1999.

We will host an open house to discuss this project on January 25, 1999 from 2:00 p.m. to 7:00 p.m. at BLM's office.

If you respond to this letter, you will remain on the mailing list for these assessments and you will receive a copy of the EAs and all other external correspondence for this action. If you do not respond, you will receive no further mailings related to these EAs. Unless you indicate otherwise, we will assume you are interested in both the BLM EA and the DNRC EA.

If you need more information, please contact George Hirschenberger at BLM, 3255 Fort Missoula Road, Missoula, MT 59804-7293 (phone 406-329-3908) or Craig Nelson at Montana DNRC, Box 388, Greenough, MT 59836-0388 (phone 406-244-5857).

Sincerely,

Nancy T Anderson

Nancy T. Anderson
Field Manager
BLM

Craig Nelson
Project Leader
DNRC

2 Enclosures
- 1 - Proposed Action (3 pp)
- 2 - Map (1 pp)

Elk Creek Vegetation Treatment and Stream Restoration

Proposed Action and Issue Scoping

PURPOSE AND NEED

The purpose of the proposed action is to bring about changes in present conditions and trends in upland, aquatic and riparian habitats and stream channels on lands administered by BLM (public lands) and DNRC (trust lands) in the Elk Creek watershed, which lies approximately 30 miles east of Missoula, Montana.

The proposed action is needed to implement management direction provided by the Garnet RMP (1986) and DNRC's State Forest Land Management Plan while still meeting DNRC's trust mandate. The proposed action will implement current policy and direction to reduce the risk of wildfire, maintain or improve water quality and manage forest, rangeland, riparian, and aquatic habitats using an ecosystem management approach. On trust lands, the proposed action is also needed to provide income to the State School Trust funds by the harvest of timber.

PROPOSED ACTION

The following proposed action is the outgrowth of an analysis of past, present, and desired future resource conditions which was jointly prepared by BLM, DNRC, and Lubrecht Forest for their lands in the Elk Creek watershed. BLM and DNRC are jointly scoping issues for this proposed action because the areas to be treated are adjacent, some of the proposed roads affect both agencies proposals and, if implemented, the actions could be coordinated to reduce costs.

BLM and DNRC propose to implement the following actions:

Within Specific Upland Forested Habitats

The following treatments are proposed to change vegetative composition, structure, and in some cases to reduce fuel loading and the risk of unwanted disturbance from fire and other agents.

- Cut, remove commercial forest products, and prescribed burn approximately 425 acres of public land and up to 335 acres of trust land. Cut and remove forest products on 250 acres of public land without burning.

- Commercially thin approximately 310 acres of public land and pre-commercially thin approximately 570 acres of public land.

- Prescribed burn approximately 290 acres of public land.

The attached map provides the exterior boundaries of the upland forested areas to be treated; only portions of the areas shown are proposed for treatment.

For specific Aquatic and Riparian Habitats

Restoration work is proposed for portions of a mile of stream channel on public lands which is not in Proper Functioning Condition.

Road construction, closure, repair, and relocation

The proposed action would require approximately 6.5 miles of temporary road and 1.5 miles of new, permanent road to implement treatments for upland forest sites. Obliteration is proposed for approximately 2.5 miles of existing road and approximately 3.5 miles of existing road will be stabilized or repaired to meet current standards and Best Management Practices.

The proposed action could take up to five years to fully implement once activities begin since some actions must be done in a particular sequence; for example, road building, timber harvest, prescribed burning, and road closure.

INITIAL ISSUES

The environmental analyses will be issue driven. The following issues have been identified to date:

Water quality: Elk Creek has been designated a water quality impaired stream by the State of Montana. Sediment delivery from roads and unstable streambanks is the greatest single problem with water quality. What effect will each alternative have on water quality?

Condition of Riparian and Aquatic Habitats: Some stream channels in this watershed have been significantly altered by historic placer mining and other land use. What effect will each alternative have on riparian and aquatic habitats?

Transportation System: The location and use of roads and trails affects resource values and uses. The proposed action would make some changes in the present density, location, and design of roads and trails. Use restrictions are now in place for many roads, trails, and geographic areas. What effect would each alternative's transportation system have on other resource values and public uses of roads and trails?

Public Recreation and Visual Enjoyment: What effect will each alternative have on recreational opportunities and the appearance of the landscape?

Condition of Upland Vegetative Communities/Wildlife Habitats and Current Risk of Undesirable Disturbance to these Communities/ Habitats: In some locations, the present forest, shrub and grassland communities, and habitats differ significantly from desired future conditions presented in the analysis. There is also a high to moderate probability of undesirable disturbance from wildfire, insect, and disease agents in some locations. What effect will each alternative have in reducing the risk of undesirable disturbance and in shifting vegetative composition, structure, and patterns toward desired future conditions?

Some of the lands included in this assessment have been invaded by noxious weeds, others are susceptible to future invasion by noxious weeds or other troublesome plants. What effect would each alternative have on prevention, containment, or control of noxious weeds?

Species of special concern: Are there Threatened or Endangered species or species proposed for listing under the Endangered Species Act present on public lands? If so, would any of the alternatives be likely to affect these species?

On State School Trust Lands, are any species included on the DNRC sensitive species list present? If so, would any of the alternatives be likely to affect these species?

Timing of actions: Can the season and duration of actions proposed under each alternative be controlled to lessen adverse effects or increase the beneficial aspects of proposed actions?

Effects of actions on other landowners/land users: What effect would each alternative have on other large landowners, small private landowners, and mining claimants in the Elk Creek watershed?

APPENDIX C
MITIGATIONS BY RESOURCE

MITIGATIONS BY RESOURCE

Mitigations common to all endangered and threatened species (plant or animal):

1. If any endangered or threatened species are encountered during project planning or implementation, all project-related activities would cease and the DNRC wildlife biologist or MNHP specialist would be informed immediately. Additional habitat protection measures may be designed and would be implemented as appropriate.

Mitigations for soil related issues:

1. Limit equipment operations to periods when soils are relatively dry,(less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
2. The logger and sale administrator will agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which existing trails to use, and what additional trails are needed. Trails that do not comply with BMP's (i.e. draw bottom trails) would not be used and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.
3. Tractor skidding should be limited to slopes less than 40%. Short steep slopes in the SE ¼ of the section may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes.
4. Slash Disposal- Limit disturbance and scarification to 30-40% of harvest units. No tractor piling on slopes over 35%. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.
5. Retain 10 to 15 tons large woody debris and all fine litter feasible following harvest. Mitigations options to maintain adequate large woody debris and foliage are:

    1) log length harvest and treat slash on site with jackpot or broadcast burn,
    2) use in woods processing equipment that leaves slash on site,
    3) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or
    4) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses.
6. Install adequate road drainage to control erosion and comply with BMP's and maintain drainage features concurrent with hauling operations. If minor cutslope or fillslope slumps occur, they would be stabilized within the course of the harvest project to control erosion. Temporary roads and eroded segments would be stabilized.
7. Promptly seed disturbed soil on reconstruction sites and disturbed soils with site adapted grasses to reduce weed encroachment and stabilize roads from erosion.

Mitigations for cultural resources and human developments:

1. Should cultural resources be identified, adverse impacts will be mitigated by project redesign or abandonment.
2. While operating within the gross project area the DNRC, the purchaser, their contractors, sub-contractors, or employees of any of them identifies a cultural resource operations shall be suspended until further investigation takes place.
3. Upon discovery, the Forest Officer shall notify the following as applicable:

    1) The County coroner.
    2) The DNRC archeologist.
    3) State Historic Preservation Office.
    4) Appropriate Native American tribe.

Mitigations for Fire Ecology and Forest Health and Vigor

1. Reserve trees should be the healthiest, largest, and fastest growing members of long-lived seral species. Other trees may be left for wildlife, visual, or hydrological reasons.
2. Development of units should be done to promote the reintroduction of fire (prescribed fire) into the project area. Units should be designed to assist in the holding of prescribed burning.

MITIGATIONS BY RESOURCE

Recommended water quality mitigation and watershed improvement measures:

1. Implement Forestry and SFLMP BMPs as the minimum standard for all operations associated with the proposed timber sale.

2. Plan, design and improve existing road systems to meet long-term access needs and to fully comply with BMPs.

3. Remedial action should be taken to reduce the extensive erosion that is occurring on Skimmerhorn Road on State Land. This road should be closed and rehabilitated as soon as possible.

4. Provide for adequate road surface drainage on all temporary or abandoned roads that will not require periodic maintenance.

5. Protect ephemeral draws, springs and other wet areas with marked equipment restriction zones. If absolutely necessary, designate locations for skid trail crossings. Use designated crossings only under dry or frozen conditions.

6. Comply with all stipulations set forth in the 124 permit and site specific alternative practices granted under the SMZ Law and Rules.

To reduce current noxious weed infestations and limit the spread of weeds the following integrated weed management mitigation measures of prevention and control will be implemented:

1. All road construction and harvest equipment will be cleaned of plant parts, mud and weed seed to prevent the introduction of noxious weeds. Equipment will be subject to inspection by forest officer prior to moving on site.

2. Revegetate all newly disturbed soils on road cuts and fills promptly with site adapted grasses (including native species) to reduce weed encroachment and stabilize roads from erosion. For grass seeding to be effective it is important to complete seeding concurrent with road construction.

3. Weed treatment measures include herbicide applications along portions of project roads and accessible sites with a priority on spot outbreaks of noxious weeds and as designated by the Forest officer. Any herbicide treatments will be implemented by a certified applicator according to herbicide label directions in accordance with applicable laws and rules of Missoula County Weed District.

4. DNRC will monitor the project area for two years. If new infestations of noxious weeds are noted, a weed management plan will be developed and implemented and coordinated with the lessee efforts.

To reduce effects upon wildlife, the following mitigation measures will be implemented:

1. If any endangered or threatened species were encountered during project planning or implementation within the analysis area, all project-related activities may cease and a DNRC wildlife biologist would be informed immediately. Additional habitat protection measures would be implemented as appropriate.

2. If active nests of an owl or other raptor were located, activities in the adjacent portion of the project area would stop until the biologist and the sale administrator could visit the site. Nest trees and all overstory trees in a 100 foot radius would be retained. Timing restrictions or nest stand protections may be implemented as well.

3. Prior to logging, the DNRC (wildlife biologist) would confirm the current wolf status in the vicinity with the U.S. Fish and Wildlife Service, Helena.

4. The contract would require limbing and topping of harvested trees in the unit or return skidding of slash back out into harvest units.

5. Some newly-constructed roads would be closed by "slashing". "Slashing" describes the process of closing a road to all potential vehicle and easy foot travel by scattering slash created by the harvest of trees over the road prism.

6. If caves or mines are found in the project or analysis areas, then a DNRC biologist would be notified, and appropriate habitat protection or timing measures would be implemented for bat protection if it is warranted.

APPENDIX D
OLD GROWTH DEFINITION

Appendix D.

Coarse Filter and Appropriate Conditions

The project followed the concepts outlined in the 1996 State Forest Lands Management Plan. The vegetation and biodiversity aspects of the project adhered to the Biodiversity Resource Management Standards laid out in the SFLMP. In addition, all pertinent laws were followed in designing the project.

The SFLMP directs DNRC to "take a coarse filter approach to biodiversity by favoring an appropriate mix of stand structures and compositions on state land" (Montana DNRC Record of Decision, 1996). To implement the coarse filter, we first need to estimate how much area each cover type historically occupied on the landscape. We call these "appropriate conditions". To determine appropriate conditions, we use our current Stand Level Inventory (SLI) data. We classify stands into cover types based on shade-intolerant (that is, sun-loving) tree species present. Shade-intolerant species are emphasized because they are currently under-represented in western landscapes, due to years of fire suppression and timber harvest. Table D-1 describes the protocol for assigning appropriate cover types from our current inventory. Once assigned, a stand is not evaluated again. This protocol is referred to as the Appropriate Conditions Filter.

TABLE D-1. PROTOCOL FOR ASSIGNING APPROPRIATE CONDITIONS BY COVER TYPE

Appropriate Cover Type*	**Stepwise Proportional Representation (%) of Species To Determine Appropriate Cover Type**				
	Ponderosa Pine	**Douglas-fir**	**Western Larch**	**Western White Pine**	**Lodgepole Pine**
Western white pine (WWP)				10	
Ponderosa pine (PP)	20				
Western larch/Douglas-Fir (WL/DF)		Western larch/Douglas-fir 30 (western larch present)			
Douglas-fir (DF)		50			
Lodgepole pine (LP)					40
Subalpine types (ALP/NC)	Habitat type >630 and stands not yet assigned				
Mixed conifer (MC)	All remaining stands				

***Types were assigned in the order listed. Once assigned a stand was not subjected to subsequent assignment criteria. Hardwoods (HW) were not included. Current nonstocked areas for Clearwater Unit (e.g., clearcuts) were tentatively classified as MC.**

For example, if the recent SLI shows that a stand is currently composed of at least 10% white pine, then the stand would be classified as an appropriate white pine stand. Local knowledge from foresters or inventory specialists may be used to adjust the results of the Appropriate Conditions filter for particular stands.

Old Growth Definition

Currently, the DNRC is using an old growth definition determined by Green et. al.(1992). This definition was developed to describe old growth stands in the northern Rocky Mountains of Montana and Idaho. Previously, most old growth definitions for this area extrapolated definitions from Washington and Oregon. This definition considers the important ecological factors that shape forests in the northern Rocky Mountains such as: fire frequency and behavior, a continental climate, an older land form with complex geologic history and soil development, insect and pathogen influences, and a completely different set of biogeographic fauna and flora.

The general area was subdivided into three separate zones. These zones were determined by the weather patterns, geomorphology, habitat types and associated flora species that are typical in those zones. The three zones established are the Northern Idaho Zone, the Western Montana Zone, and the Eastern Montana Zone. For purposes of this project, the Western Montana Zone was used. This area is generally described as the Bitterroot Mountain Divide to the Continental Divide.

The determination of old growth is made upon the habitat type, tree ages, and tree diameter at breast height (4.5 ft.). Within the Western Montana Zone; ponderosa pine, Douglas-fir, and western larch habitat type groups were determined to need a minimum age of 170 years to qualify as old growth. The minimum age for lodgepole pine groups was set at 140 and all other groups were set at 180 years.

Each old growth type within the zones were determined using habitat type groups and typed. Each type requires a minimum number of trees per acre to be classified as old growth. Within the project area, the stands within section 36 T.13N., R.14W. are within old growth type 3. The age minimum for this old growth type 3 is 140 years. Large tree diameter stocking requirement for old growth minimums is 10 trees over 13 inches DBH.

Within the project area, there are no stands that meet these definitions, and are therefore not classified as old growth.

FINDING

ELK 36 TIMBER SALE

An Environmental Analysis (EA) has been completed for the proposed Department of Natural Resources and Conservation (DNRC) Elk 36 Timber Sale. After a thorough review of the EA, project file, public correspondence, Department policies, standards and guidelines, and the State Forest Land Management Plan (SFLMP), I have made the following 3 decisions:

1. ALTERNATIVE SELECTED

Two alternatives are presented and were fully analyzed in the EA: the No-Action Alternative, which includes existing activities, but does not include a timber sale (EA, chapter II page 2); The proposed action, which proposes harvesting up to 1.5 million board feet of timber from 228 acres via ground skidding and cable yarding (EA, chapter II page 2).

For the following reasons, I have selected the proposed action without additional modifications:

a. In my opinion, the proposed action best meets the purpose and need for action and the specific project objectives listed in the EA on page 1. The proposed action generates more return to the school trust than the no action alternative. The environmental effects of the proposed action are acceptable as compared with the no action alternative. No major losses in habitat, or unacceptable effects to water or soil would occur under the proposed action. The action alternative would provide a road infrastructure for future management while the no action alternative would not.

b. The analysis of identified issues did not reveal information compelling the DNRC not to implement the proposed action.

c. The proposed action includes activities to address environmental concerns expressed by DNRC staff and the public. For example, it provides for cooperative prescribed burning and reintroduction of fire into the ecosystem (EA chapter II page 3); and improves timber stand health and productivity where harvesting is proposed (EA chapter II, pages 3 & 4).

2. SIGNIFICANCE OF IMPACTS

For the following reasons, I find that the proposed action would not have significant impacts on the human environment:

a. Overstory Cover and Movement Corridors.

The project area contains few potential movement corridors for big game, and large portions of the project area would remain unentered (EA chapter IV, page 1). Some potential corridors may be impacted by roadbuilding and harvesting, however all roads would be gated or otherwise closed, and all non-administrative vehicular travel would be illegal (EA chapter IV, page 1). Effects of harvest upon overstory cover would be mitigated through the retention of large trees with large crowns (EA chapter IV page 2) as is prescribed. As stated in the EA, it is important to understand that historically, not all acres were densely forested (EA chapter IV, page 2).

b. Old Growth

There are only two stands that meet the current DNRC definition of old growth within the section and neither are proposed for harvest (EA chapter III, page 3).
Due to extensive past harvest within this section the "building blocks" for old growth (large sized trees, large amounts of course woody debris and snags, and old trees) are scarce. As a general rule the largest size classes of trees would be retained. This would assist in the development of one of the "building blocks" (EA chapter IV, pages 2 &3).

c. Snags and Coarse Woody Debris

As is the case with Old Growth, past harvesting and other management has decreased the amount of snags and coarse woody debris (EA chapter III, page 4). As part of the action alternative, roads would be closed and decrease the removal of snags as firewood (EA chapter IV, page 3). Large western larch and ponderosa pine would be retained as part of the action alternative. These may eventually die and become large sized snags (EA chapter IV, page 3). Coarse woody debris would be increased in the short term after harvest (EA chapter IV, page 3).

d. Road-building

Currently, there is little open road within the project area. The Elk Creek County Road and the Keno-Kennedy roads are open to public travel, but many old roads are evident and not driveable (EA chapter III, page 5). A total of 5.52 miles of road would be built or improved. Of this 1.79 miles would be temporary. None of the newly constructed road would be open for public travel (EA chapter II, page 7). There is the possibility of snowmobile use of the permanent roads, however these areas are currently passable with snowmobiles (EA chapter IV, page 5). This section is steep and broken, and road placement is difficult. New roads would need to be built to manage timber within this section (EA chapter IV, page 9). Road construction would provide the DNRC with an infrastructure that does not exist to manage this land in the future (EA chapter IV, page 14).

e. Big Game Considerations

This area provides habitat for moose, elk, white-tailed deer, and mule deer. Radio telemetry data has shown that moose generally spend a majority of their time in the narrow riparian zones (EA chapter III, page 5). These areas are not part of the harvest area (EA chapter IV, page 6). Elk use the area, however telemetry data indicates it is not a key security area (EA chapter III, page 5). Prescribed burning would be expected to stimulate growth of preferred browse species (EA chapter IV, page 6). Increased road density would be a potential impact, however this is ameliorated by planned road closures (EA chapter IV, pages 5 & 6).

f. Effects upon Soils

Soils within the project area are primarily micaceous granodiorites weathered into easily eroded coarse sands (EA chapter III, page 5). Repeated ground based activities could cause cumulative effects upon soils (decreased productivity, compaction, etc.). The risk of cumulative effects should be minimized; by using old skid trails (where possible), using skid trail planning, and retaining coarse woody debris (EA chapter IV, page 7). All proposed new road and improvements to existing roads were reviewed and inventoried by the DNRC hydrologist and soil scientist. The proposed application of BMP's (Best Management Practices) would reduce expected erosion from the road surfaces (EA chapter IV, page 9).

g. Noxious Weeds

The proposed timber harvest under the action alternative includes ground disturbing activities. This has the potential to introduce noxious weeds into susceptible habitat types (EA chapter IV, page 8). Noxious weeds such as knapweed (*Centaurea maculosa*) and thistle (*Cirsium arvense*) occur within the area (EA chapter III, page 6). To prevent further spread, the action alternative would implement an Integrated Weed Management approach. This would include seeding of road surfaces, biological controls, and herbicide treatments as necessary (EA chapter IV, page 8) (EA chapter II, page 10). To decrease weed spread, all equipment would be required to be washed before any work could begin (EA chapter II, page 10).

h. Water Quality and WQLS / TMDL's

Many of the streams within the area have been affected by accelerated rates of sedimentation. Historic and recent mining, the existing road system, and grazing management practices have contributed to these impacts (EA chapter II, page 11). This proposal would not be able to change grazing management of the lower stretches of Elk Creek or change any mining practices. It would however, be able to impact road drainage concerns. Approximately 2.13 miles of old poorly designed road would be permanently closed and allowed to revegetate. New road would be needed to access the areas where these old roads are located. These old roads are steep, poorly designed and do not meet BMP's. The new roads will utilize better grade control, be well designed for surface drainage and erosion control, and will meet BMP's (EA chapter IV, page 9). The existing and proposed roads were evaluated by the DNRC hydrologist and soil scientist to determine existing and expected risk of erosion (EA chapter IV, page 9). Under the action alternative, the Old Skimmerhorn Road would be improved to decrease the risk of sediment delivery (EA chapter IV, page 9). No impacts to water quality are expected to result from the proposed action. Implementation of the proposed action meet the requirements of new and ongoing activities in 303(d) listed streams prior to TMDL development (EA chapter IV, page 10).

i. Channel Stability, Water Temperature, and Peak Flows

Under the action alternative, predicted water yield increase in all affected drainages is less with harvest than the implementation of the no-action alternative and a mixed severity wildfire (EA chapter IV, page 10 & 11). The existing channels of affected streams have been inventoried as being relatively stable (EA chapter IV, page 11). No impacts to water quality, cold-water fisheries (therefore water temperature), or other beneficial downstream uses are expected to result from the action alternative (EA chapter II, page 10).

j. Fire Ecology

Under the action alternative, timber harvesting would be used to approximate a lower intensity medium severity fire. The resulting species composition would return to a closer approximation of pre-settlement conditions. The resulting stand would be less conducive to supporting a crown fire (EA chapter IV, pages 11 & 12). Prescribed burning of activity fuels and reintroduction of fire into the ecosystem would decrease fire risk, help establish seral species, and aid in nutrient cycling (EA chapter IV, page 12).

k. Decreased Growth and Vigor of Trees

Under the action alternative, the majority of the largest trees would be retained. Much of the lodgepole pine, subalpine fir and overstocked Douglas-fir would be removed. By reducing stand density and creating species composition closer to pre-settlement times, growth and vigor would be expected to increase. Limited resources (light, water, and nutrients) would be more available to remaining trees after harvest (EA chapter IV, page 13).

l. Economics, Benefits, and Expected Project Revenues

Under the action alternative, money would be generated for the School Trusts. Net stumpage return for sawlog and pulp harvest is expected to be around $45,045.00. Forest improvement funds would be collected from the sawlog volume harvested resulting in approximately $26,175.00. This money would be used for prescribed burning, planting, and other stand improvement activities. The road infrastructure created by this timber sale would theoretically require minimal work for the next harvest entry. Increased growth and yield, and decreased fire risk would provide higher future returns and protect our long-term investment. Favoring seral species with this proposed entry would increase the chance of seral regeneration. Traditionally, long-lived seral species have returned a higher stumpage rate than the species that we would remove under the current action alternative (EA chapter IV, pages 13 & 14).

3. SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

Based on the following, I find that an EIS does not need to be prepared:

a. The EA adequately addressed the issues identified during project development and displayed the information needed to make the decisions.

b. Evaluation of the potential impacts of the proposed timber sale indicates that no significant impacts would occur.

c. Sufficient opportunities for DNRC staff and public review and comment during project development and analysis were provided. DNRC staff and public concerns were incorporated into project design and analysis of impacts.

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